Smithsonian

July 1990

An invader called 'the ant from hell' turns up the heat on Uncle Sam (p. 48)

WE'LL SHOW YOU WHAT THIS KINGDOM'S COMING TO.

Tune in to "National Audubon Society Specials" on PBS, for a fascinating look at the world around us.
This award-winning series is made possible through a grant from the people of GE.

NATIONAL AUDUBON SOCIETY SPECIALS. SUNDAYS AT 8PM ON PBS STARTING JULY 8.

NATIONAL AUDUBON SOCIETY PRODUCTIONS

Check your local listing for details.
Look for the companion book, "Audubon Perspectives: Fight for Survival."
Coproduced by Audubon, Turner Broadcasting and WETA-TV.

We bring good things to life.

ONE MINUTE MANAGERS NEED TEN SECOND MEMOS.

When People Count On You, Count On Post-it™ Notes.

"Post-it" is a trademark of 3M. © 3M, 1988.

3M

July 1990

Smithsonian

Volume 21, Number 4

Table of Contents

Cover: "Imported" fire ants (from South America) damage crops and sting animals and people, but also eat other pests, so some farmers approve of them (p. 48)
Illustration by John Huehnergarth

12 *Smithsonian horizons* by Secretary Adams
14 *Letters to the Editor*
20 *Around the Mall and beyond* by Edwards Park
28 *Phenomena, comment and notes* by John P. Wiley jr.

32 **Not so quiet flows the new Danube**
When the Main-Danube Canal opens in 1992, travelers and cargo will cross Europe on a 2,175-mile waterway
By Rudolph Chelminski, photographs by Pierre Boulat

48 **Fire ants: Too hot to handle?**
American scientists have spent 40 years trying to halt the advance of this voracious swarm. It's no picnic
By Richard Conniff
Illustrations by John Huehnergarth

60 **The meaningful abstractions of Richard Hunt**
Rooted in urban life and the black heritage, his public sculptures speak to subjects other than art
By Frank Getlein, photographs by Michael Melford

74 **Pop till you drop**
Since Walter Diemer blended it in 1928, bubble gum has been the chew of choice for kids worldwide, alas
By Robert Hendrickson
Color photographs by Chad Slattery

88 **For these fish, school never lets out**
Some species depend for survival on the close company of their piscine pals in schools or aggregations
By Joseph S. Levine
Photographs by Jeffrey L. Rotman

96 **'You must know the language of nature!'**
So says Roberto Burle Marx, the Brazilian landscape architect whose gardens and parks are odes to beauty
By Michael Parfit, photographs by Farrell Grehan

110 **The greening of Jamaica Bay**
Thanks to resolute crusaders, an urban wildlife refuge sprawls where New York City once dumped garbage
By Joseph Kastner, photographs by Wayne Sorce

120 **World War II's deadly game of connect-the-dots**
Alerted by a ring of radar, wherever the Luftwaffe flew, British fighters were there with guns blazing
By Fred Strebeigh

130 *Book reviews*
133 *Picture credits*
134 *Additional reading*
136 *July events at the Smithsonian*
140 *Smithsonian tours, seminars and expeditions*

142 **When it came to TV, my father knew best**
By Daniel Pinkwater

Smithsonian (ISSN 0037-7333) is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, DC 20560.
© Smithsonian Institution 1990. All rights reserved.
Reproduction in whole or in part without permission is prohibited.
Subscription price $20 a year in U.S. and possessions, $33 elsewhere. 80 percent of dues is designated for magazine subscription. Single copy price, $3. Second-class postage paid at Washington, DC and additional mailing offices.
Editorial offices at 900 Jefferson Drive, Washington, DC 20560.
Advertising and circulation offices at 420 Lexington Ave., New York, NY 10170.
Members: Please address all subscription correspondence and change of address information to Smithsonian, P.O. Box 55593, Boulder, CO 80322-5593.
Postmaster: Send address changes to Smithsonian, P.O. Box 55593, Boulder, CO 80302-5593.

THE NEWEST CRUISE SHIPS IN THE CARIBBEAN ARE STILL ONLY A REFLECTION OF THE NORWAY.

She's the last of the great luxury liners. A ship with a heritage no other cruise ship can match. And a style no one can re-create. A legendary ship you can sail only with Norwegian Cruise Line.

So while all the other cruise lines race to outdo each other with new ships, only Norwegian Cruise Line can show you the romance of cruising as it once was. As well as fine dining, the most exciting on-board activities and the best entertainment you'll find on any ship today.

So come experience cruising the way it was always meant to be–aboard The Norway. Because there's one thing that no cruise line can ever build in a shipyard. And it's known as tradition.

NORWEGIAN CRUISE LINE®

The Pleasure Ships.

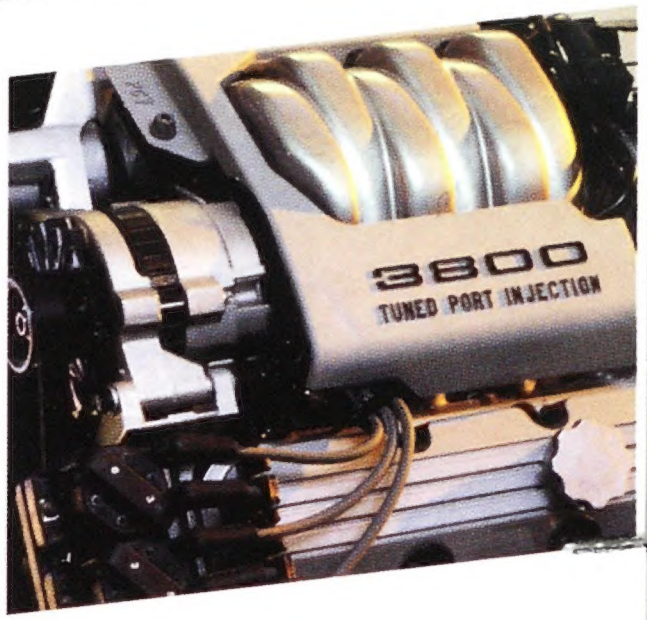
Ships' Registry: Bahamas. ©1990 Norwegian Cruise Line. For more information and a free brochure, please call 1-800-262-4NCL.

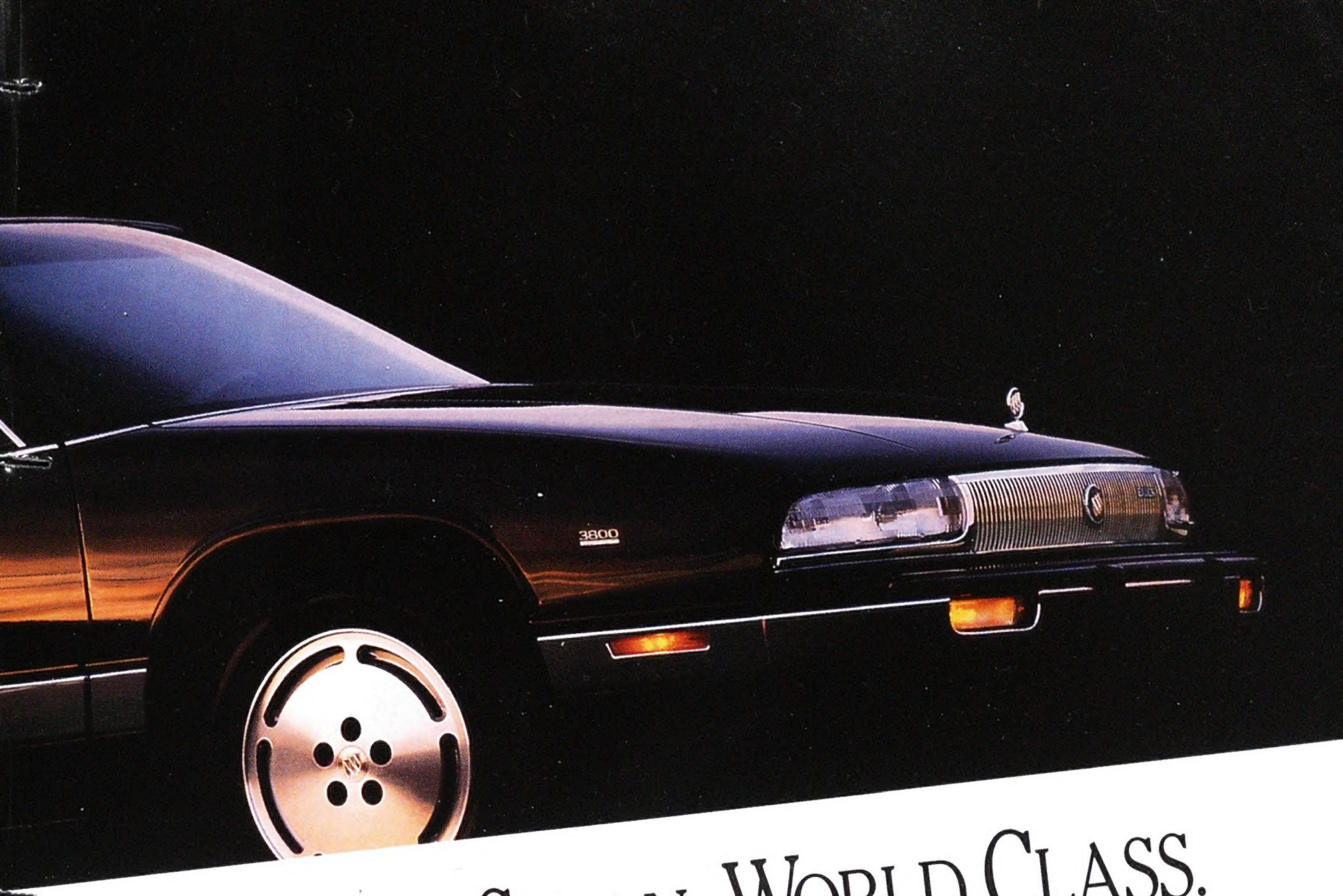
INTRODUCING A WHOLE NEW CLASS

The totally new 1991 four-door Regal.

Only its competitors will experience some discomfort. The Regal Sedan is built to further enhance Buick's reputation for quality—a reputation that is growing by leaps and bounds.

It is stylish and sophisticated. And it comes with an impressive list of standard features like air conditioning, four-wheel power disc brakes and four-wheel indepen-





OF AMERICAN SEDAN: WORLD CLASS.

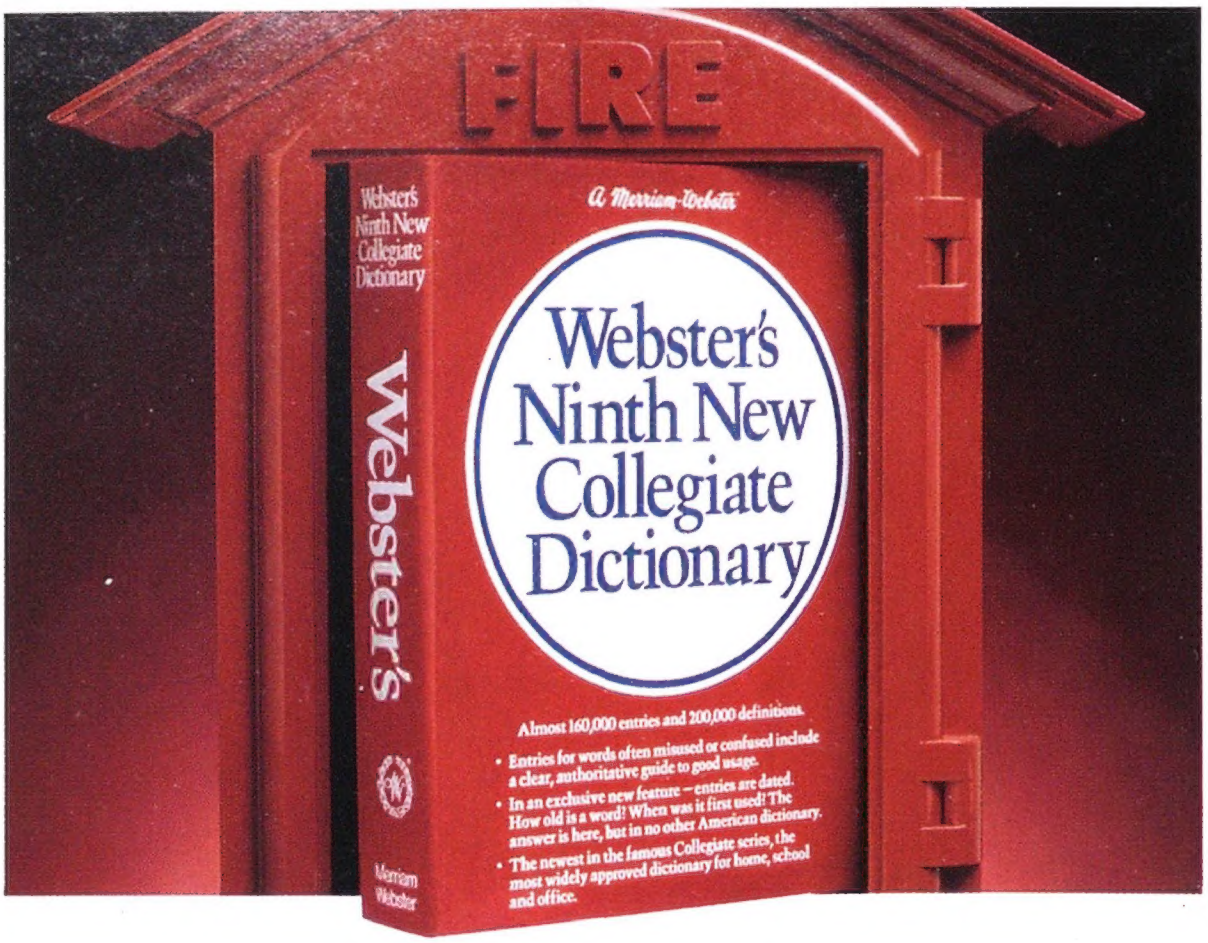
dent DynaRide suspension. Plus an even more impressive list of available features, including: ComforTemp climate control with dual temperature controls compact disc player with Concert Sound steering-wheel-mounted radio controls. Also available is a powerful 3800 tuned-port, fuel-injected V-6—a Buick exclusive.

The new Regal Sedan is in a class by itself: world class. See it at your Buick dealer now. Or you can call 1-800-423-6787 for more information.

THE NEW SYMBOL FOR QUALITY IN AMERICA.

BUICK®

GM Let's get it together...buckle up.
©1990 GM Corp. All rights reserved. Regal is a registered trademark of GM Corp.


FIRE
Webster's Ninth New Collegiate Dictionary
A Merriam-Webster
Webster's Ninth New Collegiate Dictionary
Webster's
Almost 160,000 entries and 200,000 definitions.
• Entries for words often misused or confused include a clear, authoritative guide to good usage.
• In an exclusive new feature – entries are dated. How old is a word? When was it first used? The answer is here, but in no other American dictionary.
• The newest in the famous Collegiate series, the most widely approved dictionary for home, school and office.
Merriam Webster

America's favorite to the rescue.

No other dictionary resolves more burning issues–how to spell it, how to say it, how to use it. And it's the dictionary to tell you how old a word is.

A Genuine Merriam-Webster®

More people take our word for it.

©Merriam-Webster 1989

Put the whole world at your fingertips, with . . .

Venturer MultiBand Receiver

Only $99.95*

But read the ad for an even better deal!

•We have a small monthly allotment of the Venturer 2, same as the standard Venturer, but it also plays cassette tapes. It costs $30 more—$129.95. The "special deal"—3 for the price of 2—is also available for this model.

The *Venturer* Receiver gives you crisp reception over the full ten bands of the radio spectrum, including, of course, the entire AM/FM range. But you can also roam the international shortwave and ham radio bands (4 to 12 mHz) for information from all over the world. And you can pick up the TV-audio from channels 2 to 13, a great way to keep up with your favorite programs. But there is more: Listen to 24-hr. reports of the U.S. Weather Bureau, and get news of all support services—police, fire, ships, and civil defense. Then there is the aircraft band, and all 40 channels of the CB band. The *Venturer* works off your 110-volt house current, off batteries, or off any external 12-V. DC source.

We import *Venturers* in container loads and can offer them for just $99.95. But we have an even better deal: ***Buy two for $199.90, and we'll send you a third one, with our compliments—absolutely FREE!*** Take advantage of this special offer and order your *Venturer MultiBand Receiver(s)* today!

FOR FASTEST SERVICE, ORDER
TOLL FREE (800) 882-3050
24 hours a day, 7 days a week

Please give order #1195 A401 or for the cassette version, give order #1196 A401. If you prefer, mail check or card authorization and expiration. We need daytime phone # for all orders and issuing bank for charge orders. Add ship./insur.: $6.95 for one; $8.95 for three. Add sales tax for CA delivery.

You have 30-day return and one-year warranty. We do not refund shipping charges.

since 1967
haverhills®
131 Townsend Street, San Francisco, CA 94107

Smithsonian

SECRETARY OF THE SMITHSONIAN INSTITUTION:
Robert McC. Adams

EDITOR:
Don Moser

BOARD OF EDITORS:
Constance A. Bond
Caroline Despard, Pictures
Jim Doherty
Timothy Foote
Marlane A. Liddell
Bennett Schiff
Nancy Seaman
Paul Trachtman
John P. Wiley jr.

ASSOCIATE EDITORS:
Diane M. Bolz
Kathleen M. Burke
Frances R. Glennon
Sally Scott Maran
Edgar Rich, Pictures
Jane D. Scholl

ASSISTANT EDITORS:
Suzanne Crawford
Judy Harkison
Bruce Hathaway
W. Eric Keller
Alison C. McLean
Lucinda Moore
Beth Py-Lieberman
Ruth Ravenel, Pictures

CONTRIBUTING EDITORS:
Ralph Backlund
Edwards Park

EDITORIAL ASSOCIATES:
Gloria Carr
Margot North

PUBLISHER:
Joseph J. Bonsignore
Mary D. Haskin, Assistant

ADVERTISING:
Thomas H. Black, Associate Publisher
Edward A. Daly, Manager
Robert F. Donovan, Associate Manager
Frederick T. Lyons, Eastern Manager

CIRCULATION:
John O'Donnell, Associate Publisher
Adeline Sherr, Director

ADMINISTRATION:
Carey O. Randall, Associate Publisher
Mary Ellen Bobb, Business Director
Valerie Martin, Business Manager

PRODUCTION:
E. Cherry Doyle, Director
Greg Williams, Quality Manager
Briggs S. Cunningham, Editorial
Suzanne Aldrich, Advertising

FOUNDER:
S. Dillon Ripley

EDITOR AND PUBLISHER EMERITUS:
Edward K. Thompson

TO CELEBRATE ITS
100TH ANNIVERSARY,
THE ROYAL SOCIETY FOR THE
PROTECTION OF BIRDS PRESENTS

NOBLE BIRDS

PORCELAIN SCULPTURE COLLECTION

Twelve of the world's most majestic birds exquisitely handcrafted in fine hand-painted porcelain. Created by the world-renowned bird artist George McMonigle.

The awesome power and breathtaking beauty of the noble birds of prey. Forever captured in a powerful new sculpture collection presented by The Royal Society for the Protection of Birds.

The Bald Eagle. Golden Eagle. Peregrine Falcon. Twelve breathtaking sculptures in all. Individually cast in fine porcelain. And hand-painted in nature's own colors.

The handsome wood display is included at no additional charge. To acquire this exceptional collection, please mail the attached order form by July 31, 1990.

Priced at $75 per sculpture.

The Golden Eagle. Shown smaller than actual size of approximately 6″ in height.

This beautiful display is shown smaller than actual size of 22″ high, 19″ wide, 10″ deep.

ORDER FORM Please mail by July 31, 1990.

The Franklin Mint
Franklin Center, Pennsylvania 19091

Please enter my order for Noble Birds of the World, a collection of twelve exquisite bird sculptures, crafted of fine imported porcelain and individually painted by hand.

I need send no payment now. I will receive my sculptures at the rate of one every other month and will be billed for each in 2 equal monthly installments of $37.50* beginning prior to shipment. The custom-designed handsome wood display is included at no additional charge.

*Plus my state sales tax and a total of $3. for shipping and handling.

SIGNATURE _____
ALL ORDERS ARE SUBJECT TO ACCEPTANCE

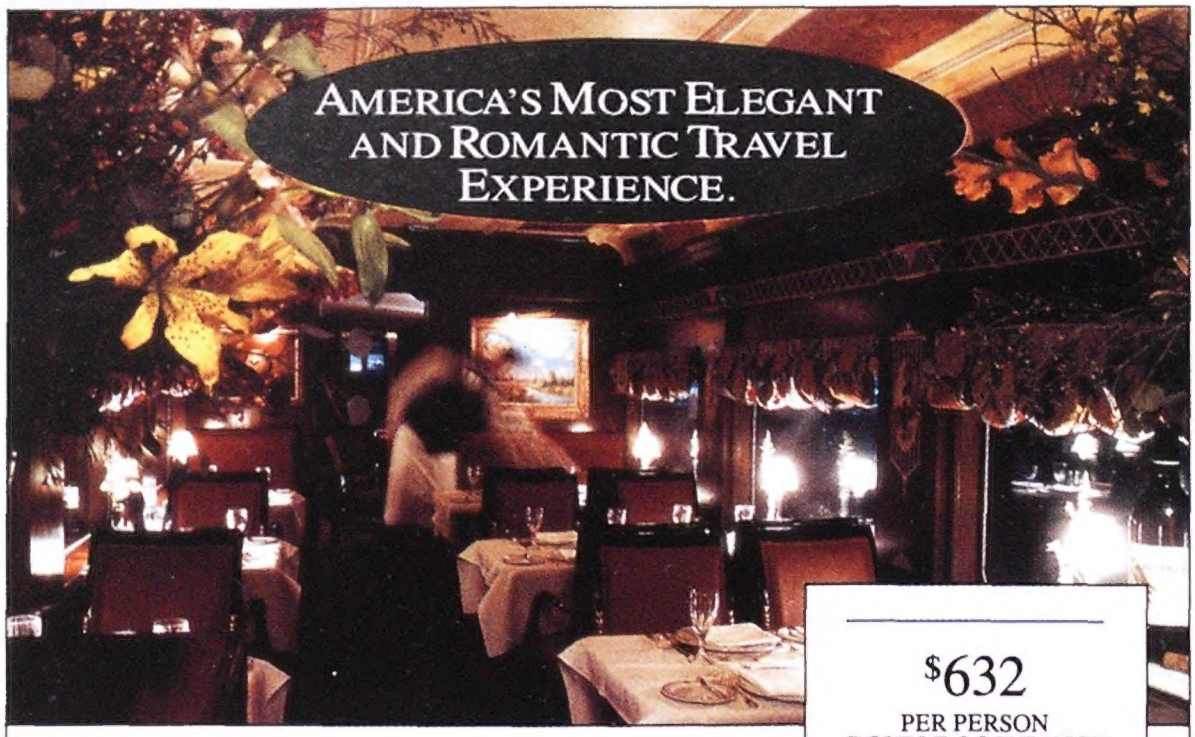
MR/MRS/MISS _____
PLEASE PRINT CLEARLY

ADDRESS _____

CITY/STATE/ZIP _____

© 1990 FM

12214-25

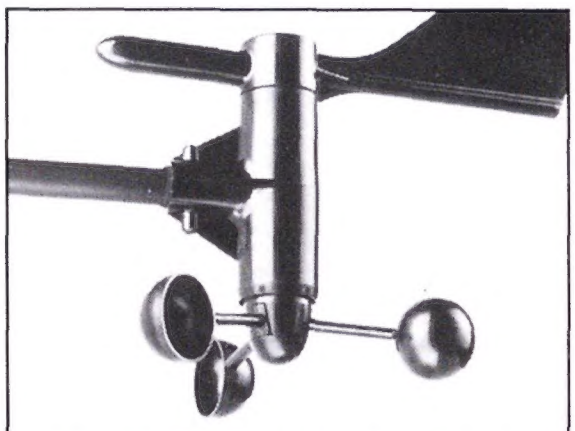


THE TRAIN ALL AMERICA IS TALKING ABOUT.

Eastbound and Westbound between
New York, Philadelphia and Chicago
& Washington and Chicago

$632
PER PERSON
DOUBLE OCCUPANCY
ROUND TRIP
Train Deluxe and
AmericanAirlines

AMERICAN-EUROPEAN EXPRESS
RAILWAY TRAIN DELUXE
RESERVATIONS 1 · 800 · 677 · 4233



PROFESSIONAL QUALITY WEATHER STATION NOW AFFORDABLE ENOUGH FOR HOME USE!

The new WeatherPro weather station uses state-of-the-art technology to give you full monitoring capability at an incredibly low price. The WeatherPro includes a weather computer, remote precision wind direction vane, wind speed sensor, external temperature probe, mounting hardware and 40' of cable-**all for only $179!**

- WIND SPEED
- TEMPERATURE
- WIND DIRECTION
- TEMPERATURE HI/LO
- RAINFALL (OPTIONAL)*
- WIND GUST
- WIND CHILL
- TIME
- AUTO SCAN
- 1 YEAR WARRANTY
- 14-DAY MONEY-BACK GUARANTEE

DIGITAR WEATHERPRO
WEATHER STATION: ONLY $179!
ORDER TODAY:1-800-678-3669, SM
M-F 7AM-5:30 PM Pacific Time

*Automatic-emptying electronic rain gauge-$49.95
Add $5.00 for shipping. CA residents add sales tax.
Fax 1-415-732-9188 • M/C and VISA

DIGITAR®
3465 DIABLO AVE, HAYWARD, CA 94545

Introductory Offer -
NEW CUSTOMERS ONLY!
Try A Little Tenderness

Candlelight,
soft music,
and magnificent,
aged Filet Mignons.
Perfect. Experts select
and prepare each filet!
Their artistry in cutting and aging is your assurance of utmost enjoyment. Steaks arrive frozen. Complete satisfaction guaranteed. Introductory Offer:

#678 4 (6 oz.)	**Filet Mignons,** 1 1/4" thick &
1 (4 oz.)	**Pkg. of Seasoned Butter Sauce**

Reg. $49.95 ..... **$29.95**
(plus $5.50 shipping and handling)

You Save $20.00 (Limit of 2, Please)
Valid in 48 States Until
July 31, 1990

Phone or mail order. Use major credit card and

Call Free 1-800-228-9055

Order today or write for FREE catalog and 10% discount coupon.

Omaha Steaks International®

Dept. AF0071 / P.O. Box 3300 / Omaha, NE 68103

Smithsonian

Board of Regents
Smithsonian Institution

Ex Officio

Chief Justice of the United States
William H. Rehnquist, Chancellor
Vice President of the United States
J. Danforth Quayle

Appointed by the President of the Senate

Hon. E. J. (Jake) Garn
Hon. Daniel P. Moynihan
Hon. James R. Sasser

Appointed by the Speaker of the House

Hon. Silvio O. Conte
Hon. Norman Y. Mineta
Hon. Jamie L. Whitten

Appointed by Joint Resolution of Congress

Hon. David C. Acheson
Hon. Anne L. Armstrong
Dr. William G. Bowen
Mrs. Jeannine Smith Clark
Hon. A. Leon Higginbotham jr.
Mr. Samuel C. Johnson
Mr. Barnabas McHenry
Dr. Homer A. Neal
Hon. R. James Woolsey

National Board of the Smithsonian Associates

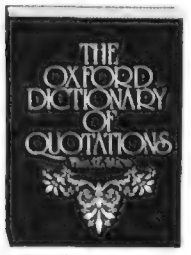
Mrs. Gay F. Wray, Chairman
Mr. Philip F. Anschutz
Mrs. Robert M. Bass
Mr. George B. Bingham jr.
Mr. W. J. Bowen
Mr. Charles L. Brown
Mr. Dan Burns
Mr. Fletcher Byrom
Mrs. Cummins Catherwood jr.
Mr. Ivan Chermayeff
Mr. Jeffrey A. Cole
Mr. Thomas G. Cousins
Mrs. George C. Dillon
Mr. James H. Evans
Mr. Peter E. Haas
Mr. John M. Harbert III
Hon. Ulric St. Clair Haynes jr.
Mr. Gerald D. Hines
Mr. Frank W. Hoch
Mr. S. Charles Kemp
Mr. Thomas M. Keresey
Mr. Robert V. Lindsay
Mrs. Bruce K. MacLaury
Mr. Alexander K. McLanahan
Mr. Antony Merck
Mrs. Anne Murray Morgan
Mr. John W. Morrison
Dr. George E. Mueller
Mr. Jack S. Parker
Mr. Thomas J. Pritzker
Mr. Alvin N. Puryear
Mrs. Arthur M. Sackler
Mr. Leveo V. Sanchez
Mr. Lloyd G. Schermer
Mr. Charles W. Schmidt
Dr. Ivan Selin
Mrs. E. Maynard Smith
Mr. A. Alfred Taubman
Mrs. James M. Walton
Hon. John C. Whitehead
Mr. T. Evans Wyckoff

Honorary Members

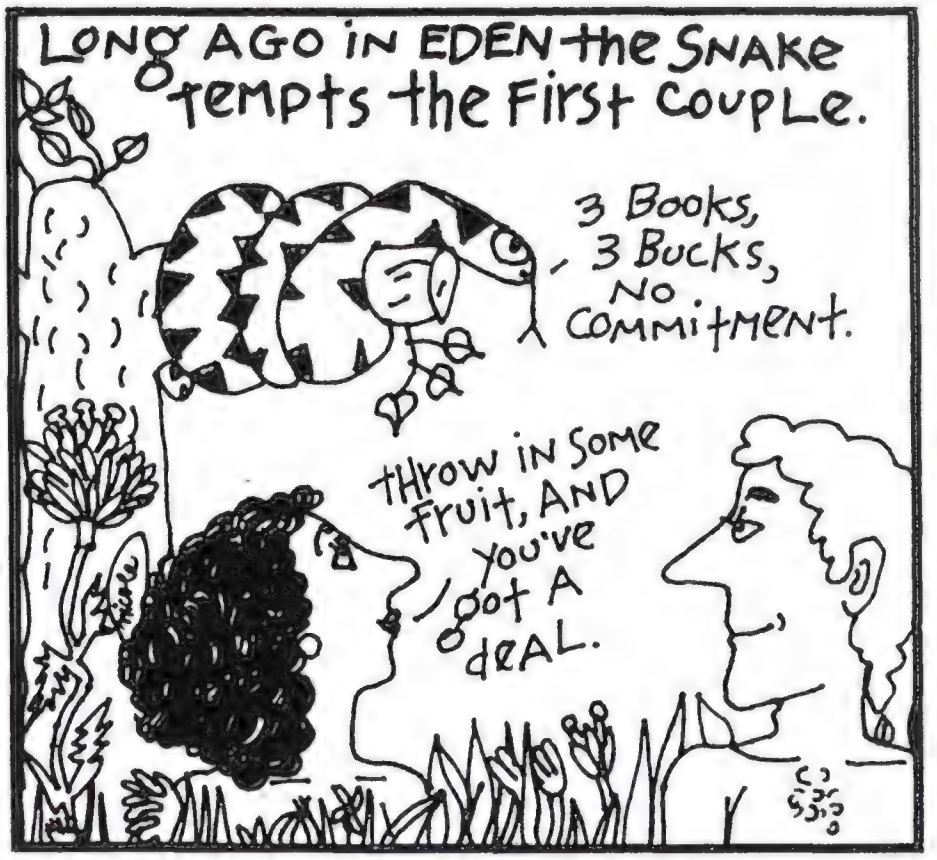
Mr. William S. Anderson
Mr. Richard P. Cooley
Mr. Joseph F. Cullman III
Mr. Charles D. Dickey jr.
Hon. Leonard K. Firestone
Mr. Alfred C. Glassell jr.
Mr. W. L. Hadley Griffin
Hon. William A. Hewitt
Mr. James M. Kemper jr.
Mr. Seymour H. Knox III
Mr. Lewis A. Lapham
Hon. George C. McGhee
Justice Sandra D. O'Connor
Mr. S. Dillon Ripley
Mr. Francis C. Rooney jr.
Hon. Thomas J. Watson jr.

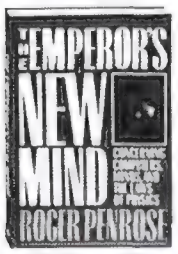
QPB. The Book Club for People Who Are Tempted by a Great Offer.

*363. A former Moscow detective investigates a fishy death in this sequel to *Gorky Park*.
Hardcover: $19.95
QPB: $9.95

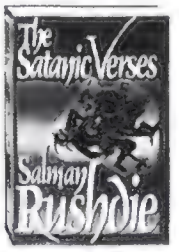


*482. This latest edition of the famous dictionary has 40,000 memorable quotations.
Hardcover: $45
QPB: $18.95





*469. This brilliant best seller explores the question: Can computers think?
Hardcover: $24.95
QPB: $12.95



*406. "A roller-coaster ride over a vast landscape of the imagination" —*London Guardian.*
Hardcover: $19.95
QPB: $9.95

The Elements of Editing A Modern Guide for Editors and Journalists
Arthur Plotnik
William Strunk Jr. and White
The Elements of Style
The Elements of Grammar
Margaret Shertzer

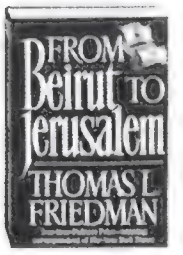
109. *The Elements of Style* discusses what good writing is; *The Elements of Grammar* gives the rules to follow; *The Elements of Editing* describes what's said best—and what's best left unsaid.
(3-volume set)
QPB: $10.95

3 books, 3 bucks. No commitment. No kidding.

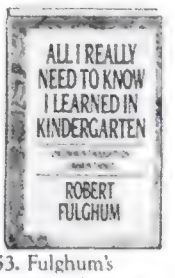
For people who love to read, QPB is paradise. Just choose 3 books from this page for only $3, plus shipping and handling, and you never have to buy another book from us again.

And that's just the genesis of what you get as a QPB member. About every 3½ weeks (15 times a year), you'll receive the *QPB Review,* which includes all our latest offerings—a tempting array of fiction, history, biography, science, humor and much more. All published in high-quality QPB softcover editions at prices up to 60% less than hardcovers. And every time you buy a QPB book, after this introductory offer, you'll receive Bonus Points that you can trade for free books—you pay just shipping and handling.

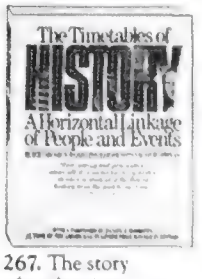
How can you resist? Join QPB today and you'll see that giving in to temptation can deliver you from overpriced books.



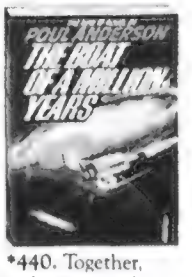
*315. The National Book Award winner brings to life the Middle Eastern world.
Hardcover: $22.95
QPB: $10.95



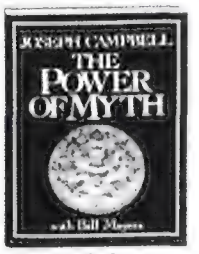
253. Fulghum's premise is that we learned the important lessons by age 5: "Play fair; Flush...."
Hardcover: $15.95
QPB: $7.95



267. The story of civilization in a unique chart format.
Hardcover: $29.95
QPB: $15.95



*440. Together, eight immortal people change the course of our earthly existence.
Hardcover: $19.95
QPB: $9.95

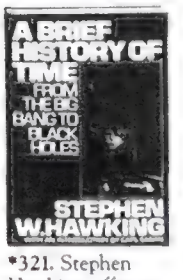


423. A scholar on mythology tells how myths have shaped our lives.
Hardcover: $27.50
QPB: $15.95

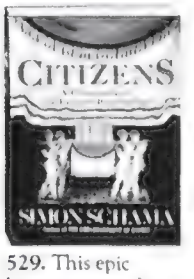
*330. An award-winning food writer offers more than 600 recipes for your microwave oven.
Hardcover: $19.95
QPB: $9.95

*117. Over 1600 problem-solving drawings with explanations on every aspect of home repair.
Hardcover: $24.95
QPB: $12.95

211. Take a trip down Larson's memory lane with over 300 color and black-and-white cartoons.
QPB: $10.95

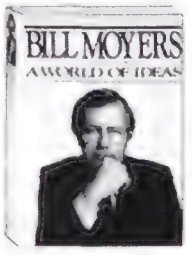


*321. Stephen Hawking offers a convincing big picture of the origins of the cosmos.
Hardcover: $18.95
QPB: $9.50

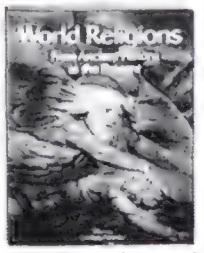


529. This epic history argues that the French Revolution liberated no one.
Hardcover: $29.95
QPB: $14.95

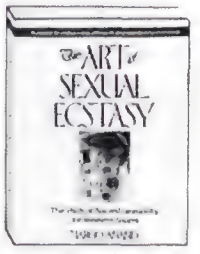
*256. What to write, how to write it, where to sell it
Hardcover: $27.95
QPB: $13.75



182. Moyers talks about everything from morality to science.
Hardcover: $29.95
QPB: $15.95



601. The evolution of beliefs throughout history. Illustrated.
Hardcover: $29.95
QPB: $12.95



*350. Turn lovemaking into a sensual and transformative experience using this explicit guide.
Hardcover: $24.95
QPB: $14.95

*QPB Exclusive: The only softcover version now available.

How QPB Membership Works.

Selection. Each *Review* lists a new Selection. If you want it, do nothing—it will be shipped automatically. If you want another book or no book at all, complete the Reply Form always enclosed and return it by the specified date. (A shipping and handling charge is added to each shipment.)

Return Privilege: If the *QPB Review* is delayed and you receive the Selection without having had 10 days to notify us, you may return it for credit.

Cancellations: You may cancel membership at any time by notifying QPB. We may cancel your membership if you elect not to buy at least one book in any six-month period.

I'm giving in to temptation. Send me my 3 books for $3.

Quality Paperback Book Club,* P.O. Box 8804, Camp Hill, PA 17011-8804

Please enroll me in QPB and send me the 3 choices I've listed below, billing me only $1 each, plus shipping and handling charges. I understand that I am not required to buy another book. You will send me the *QPB Review* (if my account is in good standing) for at least six months. If I have not bought at least one book in any six-month period, you may cancel my membership.

0-16

			Indicate by number your 3 choices

Name *(Please print clearly)* QB454-7-1

Address Apt.

City State Zip

QPB® **Quality Paperback Book Club**

Prices are generally higher in Canada. © 1990 Quality Paperback Book Club. All orders subject to approval.

CLASSIC

Vladimir Horowitz—The Last Recording (Sony Classical) 405·985

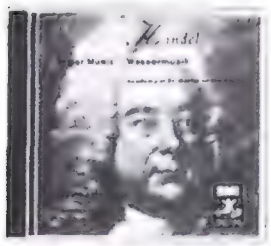
Mahler: Symphony No.2 "Resurrection." Gilbert Kaplan, London Symphony(MCA Classics) 376·517/396·515

John Williams—Spanish Guitar Favorites (CBS Master.) 378·646

Luciano Pavarotti—Pavarotti in Concert (CBS Master.) 373·548

Scarlatti: Sonatas. Anthony Newman (Newport Classic) 402·321

TAKE ANY 8 COMPACT



Handel: Water Music. Marriner, Academy of St. Martin-in-the-Fields (Angel) 401·638

Canadian Brass—English Renaissance Music (CBS Master) 403·402

Great Opera Choruses. Richard Hickox, London Symphony and Chorus (MCA Classics) 404·210

Tchaikovsky: Piano Concertos Nos. 1 & 3. Gavrilov; Ashkenazy, Berlin Philharmonic (Angel) 402·529

Debussy: Afternoon Of A Faun; others. Batiz, Sym. Orch. State of Mexico (Musicmasters) 402·255

R. Strauss & Britten: Sonatas for Cello & Piano. Yo-Yo Ma, Emmanuel Ax (CBS Master.) 402·180

Midori-Paganini Caprices (CBS Master) 389·791

Bolling: Sonatas For Two Pianos. Claude Bolling and Emanuel Ax (CBS Master) 388·546

Liszt: Piano Sonata; 3 Petrarca Sonnets; more. Vladimir Feltsman (CBS Master) 388·538

The French Collection—Jazz Impressions Of French Classics by Ravel, Debussy, Faure, Poulenc, Satie (Angel) 386·623

R. Strauss: Metamorphosen; Duet Concertino; etc. Esa-Pekka Salonen, New Stockholm Chamber Or. (CBS Master) 385·195

Evgeny Kissin Plays Chopin (ProArte) 385·120

Liszt: Hungarian Rhapsodies. Zubin Mehta and Israel Philharmonic (CBS Master) 386·607

Philip Glass: Solo Piano (CBS) 386·581

Dinner Classics—The Viennese Album (CBS Master.) 386·508

Mozart: Symphony No.41 (Jupiter); Divertimento No.1,K136. Muti, Berlin Phil. (Angel) 386·466

Stravinsky: Firebird; Jeu de Cartes. Esa-Pekka Salonen, Philharmonia (CBS Master) 385·203

Jean-Pierre Rampal—Music, My Love (CBS Master) 383·349

Haydn: Piano Sonatas 33, 38, 58, 60. Emanuel Ax (CBS Master.) 383·331

Katia And Marielle Labeque—Bernstein: West Side Story For Two Pianos and Percussion, etc. (CBS Master.) 383·323

Yo-Yo Ma—Great Cello Concertos (CBS Master) 401·604/391·607

Beethoven: Symphony No. 3 (Eroica). Norrington, London Classical Players (Angel) 382·754

Berlioz: Symphonie Fantastique. Norrington, London Classical Players (Angel) 382·747

Great Sopranos Of Our Time (Angel) 381·335

Great Tenors Of Our Time (Angel) 381·319

Handel: Highlights From "The Messiah" A. Davis, Toronto Sym. (Angel) 381·277

Steve Reich: Different Trains - Kronos Quartet / Electric Counterpoint - Pat Metheny (Nonesuch) 380·071

Placido Domingo At The Philharmonic (CBS Master.) 379·289

Enrico Caruso—Opera Arias and Songs. Milan 1902-1904 (Angel) 379·255

The King's Singers—20th Anniversary Celebration Sampler (Angel) 385·021

Dvorak: Slavonic Dances, Opp. 46 & 72. Maazel, Berlin Philharm. (Angel) 379·248

***Portrait of* Wynton Marsalis** (CBS Master) 373·555

Mendelssohn: Symphony No. 4 (Italian); Overture & Incidental Music to "A Midsummer Night's Dream." Mackerras, Orch. Of The Age Of Enlight. (Virgin Classics) 383·190

Rossini: Overtures. Marriner, Academy of St. Martin-in-the-Fields (Angel) 378·695

Tchaikovsky: Symphony No. 4; Romeo & Juliet. Abbado, Chicago Sym. (CBS Master.) 378·679

John Williams—The Great Guitar Concertos (CBS Master.) 378·638/398·636

Elgar: Enigma Variations; Pomp & Circumstance Marches. Andrew Davis, Philharmonia Or. (CBS Master.) 376·905

Mozart: Piano Concertos Nos. 9, 21. Murray Perahia (CBS Master) 376·822

Ravel: Bolero; Rapsodie Espagnole; Ma Mere L'Oye. Thomas, London Sym.(CBS Master.)376·772

Dvorak: Symphony No. 9 (New World); American Suite. Pesek and Royal Liverpool Philharmonic (Virgin Classics) 383·182

Rachmaninoff: Piano Concerto No. 3; Rhapsody On Theme Of Paganini. Feltsman; Mehta, Israel Phil. (CBS Master.) 383·315

Portrait Of Vladimir Horowitz—Mozart, Beethoven, Chopin, etc. (CBS Master.) 378·604

Wagner: Scenes From Tannhauser; Tristan und Isolde; etc. Jessye Norman; Tennstedt, London Phil. (Angel) 378·075

Borodin: Sym. No. 2; Prince Igor Overture & Polovtsian Dances. Batiz, Sym. Orch. Of Mexico (Musicmasters) 378·034

Stephen Hough—My Favorite Things. Virtuoso encores for the piano (Musicmasters) 377·465

Schumann, Grieg: Piano Concertos. Murray Perahia; Sir Colin Davis and Bavarian Radio Orch. (CBS Master.) 377·440

Anthony Newman—Beethoven: Four Great Sonatas (Newport Classic) 376·046

Canadian Brass—The Mozart Album (CBS Master) 374·561

Jascha Heifetz—The Decca Masters (Vol.1). Prokofiev, Shostakovich, Brahms, Tchaikovsky, etc. (MCA Classics) 374·009

Beethoven: Symphonies Nos. 1 & 6. Norrington, London Classical Players (Angel) 373·985

Sibelius: Valse Triste; Finlandia; etc. Berglund, Phil. Orch. (Angel) 373·621

Copland: Appalachian Spring (complete); John Henry; Letter From Home; etc. Slatkin, St. Louis Sym. (Angel) 373·563

Chopin: 4 Scherzos; Mazurkas. Emanuel Ax (CBS Master.) 372·466

Bach: Brandenberg Concertos; etc. Ransom Wilson, Gerald Schwarz, L.A. Chamber Orch. (Angel) 372·367/392·365

Lotte Lenya—Kurt Weill: Berlin & American Theatre Songs. (CBS Master) 371·138

Gershwin: American In Paris; Cuban Overture; etc. Slatkin, St. Louis Sym. (Angel) 371·096

John Williams—The Baroque Album (CBS Master.) 369·769

Beethoven: Symphonies Nos. 4 and 5. Norrington, London Classical Players (Angel) 400·184

The Bernstein Songbook—selections from West Side Story, On The Town, etc. Bernstein cond. (CBS) 371·088

Leonard Bernstein, Conductor—The Encore Collection, Vol. I (CBS Master.) 371·047

Rimsky-Korsakov: Scheherazade; Russian Easter Over.; Mehta, Israel Phil. (CBS Master.) 371·021

Claude Bolling: Bolling's Greatest Hits (CBS) 369·751

Brahms: 3 Sonatas For Violin & Piano. Anne-Sophie Mutter, Alexis Weissenberg (Angel) 369·157

Mozart: Eine Kleine Nachtmusik; **Pachelbel:** Canon; more. Marriner, Academy of St. Martin-in-the-Fields (Angel) 367·375

The Artistry of Andrew Davis—Toronto Symphony & Chamber Chorus (Fanfare/Pro Arte) 369·801

Mendelssohn: Violin Concerto; **Saint-Saens:** Intr. & Rondo Capriccioso; **Massenet:** Meditation. Nadja Salerno-Sonnenberg (Angel) 366·872

Canadian Brass—Bach: Art Of The Fugue (CBS Master) 366·740

Andres Segovia, Guitar—My Favorite Works. (The Segovia Collection, Vol. 3) (MCA Classics) 366·344

Beethoven: Symphony No. 9 (Choral). Norrington, London Classical Players (Angel) 365·619

Placido Domingo—A Love Until the End of Time (CBS) 365·262

Vladimir Feltsman—American "Live" Debut (CBS Master.) 365·254/395·251

Verdi: Requiem. Muti, Pavarotti; Chorus & Orch. of Teatro Alla Scala (Angel) 365·247/395·244

Brahms: Double Concerto. Isaac Stern, Yo-Yo Ma; Abbado, Chicago Sym.(CBS Master)367·250

French Impressions—Tortelier and English Chamber Orch. play music of Debussy, Faure, etc (Virgin Classics) 376·004

Puccini: Madama Butterfly. Scotto, Domingo, etc; Maazel, Ambrosian Opera Chorus, Phil. Orch. (CBS Master) 352·880/392·886

Tchaikovsky Waltzes—Comissiona, Houston Sym. (Pro Arte) 357·871

***Brahms:* Violin Concerto; Bruch:** Concerto No. 1. Nadja Salerno-Sonnenberg; De Waart, Minnesota Orch. (Angel) 400·135

Brahms: Piano Concerto No. 1. Peter Serkin; Robert Shaw, Atlanta Sym. (Pro Arte) 363·127

Beethoven: Complete Sonatas For Piano & Cello. Yo-Yo Ma, Emanuel Ax(CBS Master) 362·913/392·910

The Segovia Collection, Vol. 1—All-Bach Program (MCA Classics) 362·293

Bach—Preludes & Fugues For Organ, Vol. 1. Played by Anthony Newman. (Newport Classic) 356·741

Tchaikovsky: The Nutcracker. Previn, Royal Philharmonic (Angel) 355·941/395·947

Ravel: La Valse; Rapsodie Espagnole; Pavane; etc. Previn, Royal Phil. (Angel) 355·172

Vladimir Horowitz, Piano—Favorite Encores (CBS Master) 355·164

Vladimir Horowitz—*Favorite Chopin* (CBS Master) 355·156

Beethoven, Bruch: Violin Concertos. Isaac Stern (CBS Master) 353·177

Chopin: Piano Concerto No. 1. Murray Perahia; Zubin Mehta, N.Y. Phil (CBS Master) 352·955

Paul O'Dette—Robin Is To The Greenwood Gone Elizabethan Lute Music (Nonesuch) 361·758

Gilbert & Sullivan: Highlights from "The Mikado" English National Opera (MCA Classics) 359·968

Kiri Te Kanawa Sings Gershwin (Angel) 359·745

Andre Watts Plays Liszt Album 1. Six Grand Etudes After Paganini; plus much more (Angel) 352·575

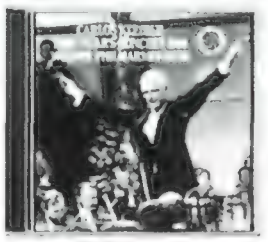
Holst: The Planets. A Davis, Toronto Sym (Angel) 352·534

Mozart: Requiem. Jean-Claude Malgoire, cond (CBS Master) 351·601

Beethoven: Piano Conc. No. 5. Perahia; Haitink, Concertgebouw Orch (CBS Masters) 357·657

Brahms: Piano Pieces, Op. 76 & 119; Fantasies, Op. 116. Richard Goode (Nonesuch) 357·145

Andre Watts At Carnegie Hall—25th Anniversary Recital. Haydn, Mozart, Schubert, Brahms (Angel) 376·053



Carlos Kleiber—New Year's Concert 1989. Vienna Philharmonic (CBS Master) 385·823/395·822

S·ON·CD

Kiri Te Kanawa—Verdi & Puccini Arias (CBS Master.) 343·269

Best Of The Canadian Brass (CBS) 401·596

The Movies Go To The Opera—Various artists (Angel Studio) 372·342

Cole Porter: Anything Goes. McGlinn, London Symphony & Ambrosian Chorus (Angel) 401·620

Isaac Stern- Humoresque —Favorite Violin Encores (CBS Master) 405·720

DISCS FOR ONLY 1¢

PLUS A CHANCE TO GET ONE MORE CD—FREE! see details below

Bach: Goldberg Variations. Glenn Gould (CBS Master.) 343·251

Tchaikovsky: 1812 Over.; Marche Slave; etc. Ozawa, Berlin Phil.(Angel) 343·244

Chopin: Four Ballades; Sonata No. 2. Andrei Gavrilov (Angel) 343·103

Beethoven: Piano & Violin Sonatas. Vol 1. I. Stern, E. Istomin (CBS Master.) 341·982/391·987

Prokofiev: Sym. No. 1 (Classical); Suite "Love Of 3 Oranges." Maazel, Orch. National de France (CBS Master.) 341·297

Yo-Yo Ma, cello—Bach: Suites Unaccompanied Cello (CBS Master.) 339·713/399·717

Gershwin: Rhapsody In Blue; etc. Tilson Thomas, L.A. Philharmonic (CBS Master.) 339·226

Mozart: Symphonies Nos. 40 & 41 (Jupiter). Kubelik, Bavarian Radio Symphony (CBS Master.) 339·044

Christopher Parkening—A Bach Celebration. Los Angles Chamber Orch. (Angel) 338·178

Bach: Sonatas For Flute & Harpsichord (cpl); more. Rampal, Pinnock. (CBS Master.) 336·578/396·572

Tchaikovsky: Violin Concerto; etc. Zukerman; Mehta, Israel Philhar. (CBS Master.) 336·461

Brahms: Symphony No. 1. Tennstedt, London Phil. (Angel) 332·668

Bizet: Carmen and L'Arlesienne Suites 1 & 2. Ozawa, Orch. Nat'l De France (Angel) 331·595

Prokofiev: Peter & The Wolf; **Saint/Saens:** Carnival Of The Animals. I. Perlman, K&M Labeque; Mehta, Israel Philharmonic (Angel) 331·322

Mozart's Greatest Hits—Theme From Elvira Madigan; Rondo Alla Turca; more. Various artists (CBS Master.) 330·613

Wagner: Overtures. Tannhauser; Lohengrin; Die Meistersinger; more. Tennstedt, Berlin Phil.(Angel) 330·134

Mozart: Piano Concerto 26; Rondos. Perahia, English Chamber Orch. (CBS Master.) 328·740

Nancy Allen, Harp—Works by Ravel & Debussy. Tokyo String Quartet; Schwarz, L.A. Chamber Orch. (Angel) 328·013

Beethoven: Symphony No. 5; **Schubert:** Symphony No. 8 (Unfinished). Maazel, Vienna Philharm. (CBS Masters.) 321·570

Bach's Greatest Hits, Vol.1.—Toccata & Fugue; etc. Biggs, Casals; etc. (CBS Master.) 330·530

Tchaikovsky: Suites From The Ballets: Swan Lake & Sleeping Beauty. Muti, Philadelphia Orch. (Angel) 334·680

Mahler: Symphony No. 4. Kathleen Battle, Soprano; Lorin Maazel, Vienna Phil.(CBS Master.) 332·866

Mozart: Overtures. Marriner, Academy of St. Martin-in-the-Fields (Angel) 321·224

Isaac Stern—60th Anniversary Celebration. With Zukerman, Perlman, Mehta, New York Phil. (CBS Master.) 311·647

Wagner: Overtures. Maazel, Philharmonia (CBS Master.) 310·086

Stravinsky: Rite Of Spring. Mehta, New York Phil. (CBS Master.) 281·493

Jean-Pierre Rampal—Rampal's Greatest Hits (CBS Master.) 280·610

Schubert: Impromptus, Opp. 90 & 142. M. Perahia (CBS Master.) 343·707

Kathleen Battle Sings Mozart. Previn, Royal Phil. (Angel) 350·587

Mahler: Symphony No. 1. Maazel, Vienna Phil. (CBS Master.) 349·936

Dowland: The English Orpheus. Emma Kirkby and Anthony Rooley (Virgin Classics) 404·301

Richard Strauss: Ein Heldenleben; more. Thomas, London Sym. (CBS Master.) 376·780

John Adams: Fearful Symmetries; The Wound Dresser. Orch. St. Luke's (Nonesuch) 402·552

Kiri Te Kanawa—French Opera Arias. (Angel) 402·149

Amore—The Great Italian Love Arias. Te Kanawa, Pavarotti, Marton, more. (CBS Master.) 402·081

Bach: Complete Lute Suites. Sharon Isbin, guitar (Virgin Classics) 401·554

Fright Night—Music That Goes Bump In The Night. (CBS) 400·143

Placido Domingo—The Unknown Puccini (CBS Master) 387·829

Maria Callas— The Incomparable Callas. Favorite arias (Angel) 400·200

Show Boat—Broadway Show Album. McGlinn, cond. (Angel) 402·586

Puccini's Greatest Hits. Te Kanawa, Pavarotti, Marton, Carreras, Tucker (CBS Master.) 405·811

Sweet Dreams—Music by Brahms, Chopin, Debussy, Greig, etc. (CBS) 389·296

Dvorak: Violin Concerto; Romance; Carnival Over. Midori; Mehta, NY Phil. (CBS Master.) 386·573

John McLaughlin: The Mediterranean Concerto For Guitar & Orch.; Duos For Piano & Guitar. Katia Labeque; Thomas, London Sym. (CBS) 388·777

Karajan Conducts Orchestral Favorites, Vol. 1 (Angel) 388·645

Draw On Sweet Night—English Madrigals. Hillard Ensemble (Angel) 388·587

Dinner Classics—The Sunday Brunch Album (CBS Master.) 386·474

Eliot Fisk—American Virtuoso. Bach, Scarlatti, etc., on guitar (Musicmasters) 373·662

Rachmaninoff: Piano Concerto No.3. Gavrilov; Muti, Philadelphia Orch. (Angel) 364·133

Teresa Stratas Sings Weill. Schwarz, Y Chamber Sym. (Nonesuch) 349·670

Debussy: Nocturnes; LaMer. Tilson Thomas, Philharmonia Orchestra (CBS Master.) 343·665

Bizet, Faure, Ibert, Ravel. —Bizet, Faure, Ibert, Ravel. Richard Hickox, City Of London Sinfonia (Virgin Classics) 402·545

***The Pachelbel Canon* & Other Digital Delights.** Davis, Toronto Chamber Orch. (Fanfare) 348·649

HERE'S HOW TO GET YOUR 8 CDs FOR 1¢...

- **Just mail the coupon** and we'll send your 8 CDs, together with a bill for only 1¢, plus shipping and handling.
- **You agree** to buy just six more selections in the next three years, at regular Club prices (currently $12.98 to $15.98, plus shipping and handling)–and you may cancel membership at any time after doing so.
- **Free Music Magazine** sent every four weeks (up to13 times a year), describing the Regular Selection, plus hundreds of alternate classical recordings, as well as new releases and all-time favorites from other fields of music. And Special Selection mailings up to six times a year (total of up to 19 buying opportunities).
- **Buy only what you want!** If you want the Regular or Special Selection, do nothing–it will be sent automatically. If you'd prefer an alternate selection, or none at all, just mail the response card always provided by the date specified.
- **You always have 10 days to decide;** if not, you may return the Selection at our expense.
- **Half-Price Bonus Plan.** If you continue your membership after fulfilling your obligation, you'll be eligible for our money-saving bonus plan. It lets you buy one CD at half-price for each CD you buy at regular Club prices.
- **10-Day Free Trial.** We'll send details of the Club's operation with your introductory package. If not satisfied, return everything within 10 days and you will have no further obligation.
- **Extra Bonus Offer:** You may take one additional CD right now at the super-low price of only $6.95–and you are then entitled to take an extra CD as a bonus FREE! And you'll receive your discounted CD and your bonus CD with your 8 introductory selections–**a total of 10 CDs in all!**

© 1990 CBS Records Inc.

COLUMBIA HOUSE: Terre Haute, IN 47811

Selections with two numbers contain 2 CDs and count as 2 — so write in both numbers

COLUMBIA HOUSE, 1400 N. Fruitridge Ave.
P.O. Box 1129, Terre Haute, Indiana 47811-1129

227/F90

Please accept my membership under the terms outlined in this advertisement. Send me the 8 CDs listed below and bill me only 1¢, plus shipping and handling. I agree to buy six more selections, at regular Club prices, in the coming three years—and may cancel my membership at any time after doing so.

SEND ME THESE 8 CDs FOR 1¢		

Send my ☑ CLASSICAL CDs to the following address:

Mr
Mrs. _____
Miss Print First Name Initial Last Name

Address _____ Apt _____

City _____

State _____ Zip _____

Do you have a VCR? (04) ☐ Yes ☐ No
Do you have a credit card? (03) ☐ Yes ☐ No

JXJ/F6 JXK/59

☐ **Extra Bonus Offer:** Also send one more CD now, for which I will be billed only $6.95

...and I'm entitled to get this extra CD FREE!

Note: we reserve the right to reject any application or cancel any membership. These offers not available in APO, FPO, Alaska, Hawaii, Puerto Rico; write for details of alternative offer. Canadian residents serviced from Toronto. Applicable sales tax added to all orders.

Smithsonian horizons

New patterns and perspectives are leading us across old boundaries—national, institutional and urban

The feeling is widespread that this is an era of rapid but uncertain transitions. Most evident to individuals are the growing complexity of their everyday routines and an accompanying awareness of added dimensions of vulnerability. One might well ask, of course, whether things were ever really static, at least since the rising tempo of the Industrial Revolution. But what is under way currently is a deeper shift, threatening to reweave not only our material setting but the entire fabric of everyone's cognition and persona as well. As Raymond Williams observed, of another time and place, in *The Country and the City* (Hogarth Press, 1985), it is as if we have come to occupy an unsettling borderland, "between custom and education, between work and ideas, between love of place and experience of change."

Historical perspectives were long the privileged ones, regarded by scholars as shaping and constraining the intersection of forces within a relatively unproblematic field of potential understanding. Now, however, we are turning away from a search for continuities across time and entering what has perceptively been called the epoch of simultaneity.

Part of the new outlook stems from a growing recognition of the natural wreckage we have caused and the common, planetary dangers with which we fear it confronts us. But surely a larger part merely reflects sports, styles, figures of speech, consumer products, entertainment, and the shallowly repetitive, event-dominated streams of bits and bytes that we describe as news. Smothering our capacity for attention, this information (savor the irony in T. S. Eliot's line, "Where is the knowledge we have lost in information?") circles the world at all but the speed of light.

Vast webs of narrowly focused but overlapping interrelations are coming to dominate our lives. Increasingly, they override traditional boundaries—national, institutional, urban. As the localized bonds of community identity dissolve with the breakup of large-scale manufacturing and its dispersal into multiple centers, only inert neighborhoods tend to be left. Meanwhile the word "community" balloons outward into contrived and curious new configurations. It is applied increasingly, for example, to highly dispersed and heterogeneous collectivities linked by as little as a tenuous thread of common interest.

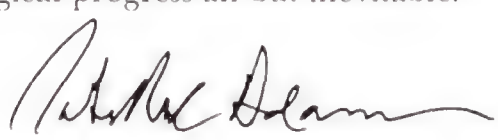
Becoming similarly fragmented, and for similar reasons, is humankind's primordial group, the family. Steadily receding as a measurable unit of cohabitation, it is replaced in census parlance by more-atomistic households, which on statistical average now number only 2.6 persons. A familiar world of primary associations is merging, in short, into one dominated by intricate, spidery networks of more impersonal negotiation, detached from place.

Alongside massive flows of people (ranging from involuntary flights of refugees to awesome tides that surge back and forth daily along California freeways) are consciously directed, even more massive, movements of capital, industry, ideas, scientific findings and aspirations for a better life. Greater interdependence can be, but is not automatically, accompanied by greater amity, liberty or security. The locus of decision making, for example, can be moved around the world to escape any face-to-face contact with those most affected. With ongoing dislocation, racial and ethnic rivalries may appear in new settings and take on new virulence. On the other hand, the abruptness with which repressive regimes in Eastern Europe were swept away has surely been an object lesson in the ultimately irresistible circulation of ideas as an antidote to powerlessness.

As historian Frederic Wakeman jr. of the University of California, Berkeley, has noted, much of this new patterning is still so ill-defined that we must grope for ways to subject it to disciplined study. To what degree, for example, are flows of national resources, currencies, markets, political platforms, standards of conduct, or even political or philosophical outlooks becoming interchangeable? What kind of analytical net is needed for such consequential but amorphous tendencies as the global emergence of a new underclass, or the spread of English and the access to power associated with speaking English?

To a striking extent, in other words, the world is indeed becoming a many-layered but unitary marketplace. This gigantic fact is the central focus of a great new exhibition at the National Museum of American History, "Information Age: People, Information & Technology." It is certainly the most technically complex and interactive exhibition that the Smithsonian has ever undertaken. Beginning with the telegraph, it follows the pace of invention and innovation through the breathtakingly rapid, truly revolutionary microelectronic advances of our own time.

However, as impressive as are the speed, capacity and cost-effectiveness of the ways in which we transfer, process and store information, we should remember that they are merely tools that enable, not enforce. Instead, it is almost always the demands generated by still more far-reaching socioeconomic and interpersonal trends like those I have mentioned that make such striking technological progress all but inevitable.



Quality is Job 1.℠

Profile in quality #14:
Driveability.

The sophisticated engineering of today's Ford Motor Company cars and trucks is truly remarkable. For instance, today's Mercury Cougar XR7 and Ford Thunderbird Super Coupe have a speed sensitive electronic rack and pinion steering system that provides optimum driving control. Their new adjustable suspension system monitors driving conditions, automatically making adjustments to optimize ride and handling. And both cars are equipped with four-wheel disc anti-lock brakes.
If your goal is to build the highest quality cars and trucks in the world—you don't do it any other way.

Ford, Mercury, Lincoln, Ford Trucks.
Our goal is to build the highest quality cars and trucks in the world.℠

Ford

FORD MOTOR COMPANY

Buckle up—together we can save lives.

Letters to the Editor

The wild turkey

Dear Sir: Having read your May article on the resurgence of the wild turkey, I set out last week on my morning walk in the Northern California foothills. Suddenly, I heard a lot of *gobble, gobble.* Down the hillside, in an open, sunny spot among the oaks and pines, were eight huge, displaying toms. Four young hens were nonchalantly pecking their way uphill.

I hadn't the patience to wait it out, but when I returned from my one-mile circle, there was considerable conversation going on in the nearby scrub.

Please extend the Gould's wild turkey range to include California's Sierra foothills, in quantum.
Betty Buker
Penn Valley, California

Dear Sir: I was dismayed to find the picture of a coyote captioned, "Discovered in the act, predator stands over Eastern wild turkey. . . ." while under the picture of a man, "A successful hunter totes his tom. . . ."

Both are successful predators, with the man having the advantage of camouflage, fake calls and a supermarket for dinner if he fails. The four-legged predators are in the game for real.
Lynda G. Johnson
Owego, New York

Dear Sir: Wild turkeys are making a comeback even in urban areas. My parents' suburban home south of St. Louis adjoins the forest along the Merrimac River, where my dad grows gooseberries, tomatoes and a small salad garden. The wildlife leave him a little. A plethora of birds drop some of the millet he feeds them at the bottom of a steep unmowed area, where it sprouts. He has spotted many small animals and birds there. One evening this spring, my dad and nephew spotted new members in his wildlife community—four wild turkeys dining on the millet.
Georgene Nolte Barnes
Arcata, California

Dear Sir: I first encountered Elwood, our local wild turkey celebrity, one morning as I was going to work on the road that runs in front of Kennesaw Mountain National Battlefield Park. I about wrecked my car to keep from hitting him, although he was not trying to cross this busy street—just watching the cars go by. My fellow workers thought I was crazy when I told them about this darn turkey, but once the *Marietta Daily Journal* ran an article, even at 7:15 A.M. people were in the area just to see Elwood. He seemed to have lost all fear of humans.

Taking no chances, the Park Service later moved him to a very remote area of the park.
Nina L. Carlson
Acworth, Georgia

The Adams family

Dear Sir: In my dotage I have become a history buff, which is strange because the beady-eyed curmudgeon who dished out deadly boring dates with an iron hand and chilling delivery turned our young minds to cement.

Thus to read Barbara Holland's wonderful work on the Adams family was akin to winning the lottery. Such a wondrous bright, witty work gladdens my heart.

Too bad history textbooks of today couldn't be written in a similar style. The academicians would blanch at the thought. Her essay, making those almost unreal, far-off days come alive and be meaningful, as though real people lived in them, should be required reading for all high school history students.
David F. Soule
Mayville, New York

Dear Sir: Boy, I sure wish Barbara Holland had been my American history teacher instead of Coach Whitsett. All I remember of that year was that we got to listen to the World Series because Coach's favorite team was in the finals.

It took me 40 years to discover and appreciate the journals of William Maclay, Pennsylvania's irascible delegate to the first Congress. He makes John Adams seem downright mellow by comparison.
Marthena Cowart
Washington, D.C.

Dear Sir: You mentioned Benjamin Franklin's penchant for older women while in France with Adams. You were perhaps thinking of a letter to a young man, wherein he recommends older women because of their appreciation and discretion, adding that, "in the dark, all cats are Grey."

While in France to negotiate a treaty of alliance during the American Revolution, Franklin [below], then in his 70s, cut a wide swath in the French court with the younger ladies. A co-commissioner, Dr. Arthur Lee, a highly intelligent, shy, ugly yet righteous young man, attempted to make time with some of these young ladies and was laughingly rebuffed with the words, "Oh Dr. Lee, you are much too young." I believe he was in his mid-30s at the time.
William H. Hunter
Clemson, South Carolina

National Portrait Gallery

Dear Sir: There's sure to be disapproval by some all-too-intensely-solemn history buffs, but Barbara Holland has proved that history can be fun. I'd be more than happy to repeat my 1947 exposure to History of Western Civilization if she could rewrite the textbook. I'll save Holland's hilariously irreverent account of the Adams family for my granddaughter to read the day she moans "history is *so* boring."
Ann I. Hays
Dublin, Mississippi

"KEEP IT CLEAN."

Madeleine Marchese
General Manager, Marketing
Texaco Syngas Inc.

"For five years, Texaco's gasification technology lighted 100,000 homes with clean energy from coal. We keep it clean with a gasification process that we invented and perfected. It's a very workable solution to a difficult environmental problem."

Madeleine Marchese is General Manager, Marketing for Texaco Syngas Inc.

"Our coal gasification process has produced over 2.5 billion kilowatt hours of electricity for California residents. That's a record no other coal gasification process has even come close to.

"The Texaco process has not only been proven economically, it exceeds the clean air standards proposed by the Bush Administration. That proposal is for the year 2000. Texaco is ready *now.*

"As a technology, coal gasification is a powerful tool in the fight against acid rain. As an alternate energy source, it makes us more energy self-sufficient. We have a 300 year supply of coal at current consumption rates.

"Texaco people have even devised ingenious methods to expand the technology for the gasification of municipal sludge. Our process is designed not only to get rid of sludge but to *transform* it into usable energy."

Clearly, there is enormous potential for America and its environment. And for the future.

Star of the American Road

TEXACO–WE'VE GOT THE ENERGY.

Dear Sir: Fun is fun, humor is humor, both are necessary in life, but desecration of our history and our forefathers is Barbara Holland's blasphemy.
Willis A. McCaleb
Walhonding, Ohio

Angkor Wat

Dear Sir: In 1966 my late husband and I had a fabulous trip that included Cambodia. All we knew about it was that its prince had just "stated" for the North Vietnamese, and we were uneasy.

Nonetheless, we became totally fascinated with Angkor Wat and related areas, and with the restoration work that the French had done.

For years we have remembered the cuckoos cuckooing off in the jungle, the little lizard in our bathtub and the women fishing with queer little scoopy baskets, but mostly we have wondered about whether the jungle would take over once more, and if anybody cared.
Catharine Gibson
Monroe, Michigan

Jigsaw puzzles

Dear Sir: Richard Wolkomir didn't mention a phenomenon I have observed so frequently I've come to believe it a necessary behavioral adjunct: the puzzler's double tap.

I have seen puzzles spread out on game tables and card tables and on any available surface in lunchrooms and staff recreation rooms. Universally, the puzzlers exhibit the double tap. This is a little index-finger motion executed after a piece has been fitted—a light tap on the piece *twice*, totally unnecessary for setting the piece firmly in place. It must be a little tic of self-satisfaction, or a modest notice to others: "Hey, look at me! I put in a piece of the demon puzzle while the rest of you were just wasting your time gossiping and drinking your coffee."
Joyce A. Bell
Tucson, Arizona

Dear Sir: Probably the world's largest jigsaw puzzle was started on August 15, 1927, and finished February 15, 1928. The subject was West Point; the size, 5½ by 6¼ feet; the number of pieces, 10,000 (no two alike); the cost, $150; the estimated hours were 2,500.

The idea was conceived by Pierrepont Noyes, president of Oneida Community Ltd., and his nephew, Ray Noyes. A photograph of the Point was pasted onto plywood. Ray and a helper cut the huge affair into 12 sections. Expert operators in Salem, Massachusetts, cut them into roughly 10,000 pieces.

These pieces were spread out on a table in an apartment rented in the Mansion House here in Oneida to facilitate assemblage. The apartment house residents and people from nearby homes worked on it. Protected under glass, the giant puzzle [below] still hangs in Mansion House.
Jane K. Rich
Oneida, New York

Charles Lummis

Dear Sir: My mother, Josephine Nichols May, was a classmate of Charles F. Lummis' illegitimate daughter, Bertha Paige Lummis Bush. In the late 1890s both attended Northfield Seminary, a boarding school for girls in East Northfield, Massachusetts, and became lifelong friends.

When Bertha was 21 she was told who her father was and wrote to him. Charles F. Lummis arranged to meet her in Boston.

A mutual friend wrote me: "She hardly mentioned her mother, but idolized her father." Explaining a small handgun she kept in a shadow box on a wall, Bertha said he had used it to fight a duel with another student at Harvard—a duel over her mother. He was expelled because of it.

Bertha's apartment in San Francisco was a shrine to him. A large portrait with his decorations from the king of Spain dominated the living room. She treasured every honor that had been bestowed upon him, and his friendships with celebrities such as Mary Austin and Mary Garden. Of course Bertha thought him the grandest of all.

According to my mother, there was no confrontation, as David Roberts states. It was Bertha who cared for him for many years and nursed him during his final illness with brain cancer.
Barbara M. Honea
Amarillo, Texas

Floyd Collins

Dear Sir: If there was a hero in the Floyd Collins story, it was William Burke Miller, the plucky *Louisville Courier-Journal* reporter who won a Pulitzer for his coverage of the story. After leaving the *Courier-Journal*, Skeets worked for NBC for many years. His small size and light weight once proved advantageous—when he was invited to cover Pan American Airways' first Clipper flight to the Philippines.
Shirley F. Woodell
Albuquerque, New Mexico

Dear Sir: A most important aspect of Floyd Collins' death was the emotional impact of the song "The Death of Floyd Collins." I well remember hearing it as an 11-year-old boy. Men would stand in silence and women would cry every time the song was sung over the radio.
George Sallick
Milton, Florida

Mownomania

Dear Sir: Mr. Wolkomir failed to mention that the English used cattle to control the grass in the great parks surrounding large manor houses. In fact, they developed a breed of cattle specifically for this purpose, the English park cattle. These animals are sometimes seen in paintings by 19th-century landscape painters.
Philip Leighly
Rolla, Missouri

Smithsonian horizons

Dear Sir: The world has little noted—but should long remember—that the Hubble Space Telescope would not be in space, enlarging our horizons and our knowledge, but for James Lynn, who, as director of the Office of Management and Budget in the Ford Administration, preserved its funding in the federal budget when doubters, naysayers and champions of other priorities nearly blue-penciled it.
Bruce H. Hasenkamp
Hillsborough, California

You're Looking At The Inspiration
Behind Our Potenza Performance Tires.
Bridgestone Potenzas were designed in motion. For the way you drive. So they can hug, hold, turn and stop on any kind of road.
Proving once again that there are many paths to innovation.
BRIDGESTONE

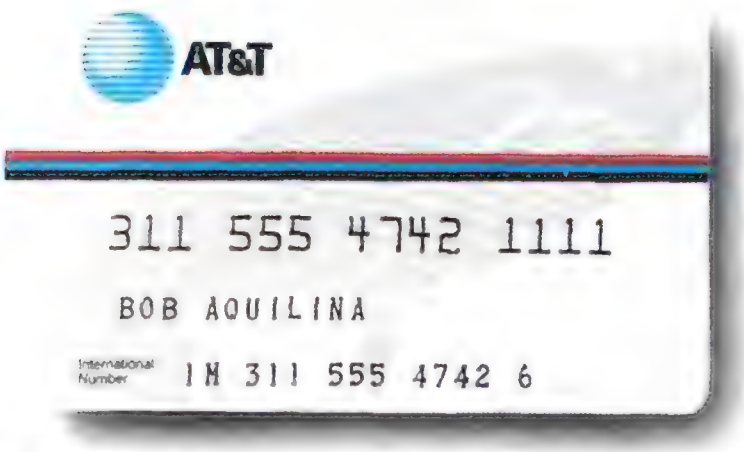
Six cities. Two days.

Easy.

The *AT&T Calling Card* makes it easy to cover a lot of ground. No other calling card even comes close to letting you call so many places around the world from so many places in the U.S.

Or offers as many operators to speed your calls through. Or gives you as much service.

No other calling card connects you to a worldwide network as reliable as ours. And does it all with the ease and convenience of the world's most widely accepted calling card.



So if you don't have the *AT&T Calling Card,* make sure getting one is the next thing on your itinerary.

To get your free *AT&T Calling Card,* call **1 800 551-3131 Ext. 4203.**

AT&T. How can we help you?℠

AT&T
The right choice.

© 1990 AT&T

Another reason to get Invisible Fencing.

Give your dog freedom and safety.
Invisible Fencing® is veterinarian approved
and comes with a money-back guarantee.
To learn all the other reasons,
call for a free brochure.

1-800-635-8300

INVISIBLE FENCING®

© 1990 Invisible Fence Company, Inc.

Great Art for All Who Love It!

Exact replicas *on canvas* of oil painting masterpieces that recreate the texture, colors and detail of the originals. Our replicas are the compact discs of fine art reproductions. You must see them!

THE MASTERS' COLLECTION, our 100 page **full color** Catalogue of over 370 ***elegantly framed*** Portraits, Impressionists, Florals, Nauticals and more - ***$5.00.***

Credit card orders, call **1-800-2-CANVAS, ext. 236**
Or, send check, m.o. or MC/Visa, Am.Ex.
(Card name, #, exp. date) to:

H.A. DeNUNZIO Co., Inc.,
Box 11-7540, Dept. 236, Newington, CT 06111

BOOKS ON TAPE®

World's Largest Selection of Audio Books

- Best Sellers on Cassette
- Full-length Readings
- Call for Free Brochure

Box 7900-S, Newport Beach, CA 92658

Reg. U.S. Pat. & T.M. Off.

(800) 626-3333

Around the Mall and beyond

When I reached the Museum of American History at 9, an hour before it opened, crammed buses were already spilling a bright-colored flood of teenagers onto the steps. They washed around the locked doors and streamed, shrieking, onto the Mall. Sea gulls, gorging on yesterday's picnic scraps, grudgingly flapped off. A street person sat up in bleary surprise, then sank back on his warm grating.

Rendered special by my identification tag, I strode past them all, found an unlocked door and, nodding to the guard, entered. I headed straight for the place where I suspected that a couple of battalions of those springtime school kids would soon establish their bridgehead—the museum's new, much-discussed, permanent exhibition "Information Age: People, Information & Technology" (see *Smithsonian horizons*, page 12). Meanwhile, I would have the show pretty much to myself. I could roam nearly a third of an acre of the museum's first floor and be led through an intensive, entertaining seminar about the kind of world we've been working on for the past century and a half.

I'd been through the exhibit before it opened and felt that I understood the historical section. My notes recalled the sequence: messages sent first through telegraph lines, then without them, by wireless. Conversation exchanged over telephone lines, then without them, by radio. Similar inventions in sending visual messages and in acquiring information.

This new Smithsonian show illuminates technological achievements by reminding viewers of their familiar uses: a stockbroker's ticker-tape machine; a grocery store cash register; even a racetrack tote board.

I'd always thought of great inventions

in terms of great names—Samuel F. B. Morse, Alexander Graham Bell, Thomas Alva Edison, Guglielmo Marconi—each standing on a private plateau of achievement. But this show has reminded me that Morse had no sooner tapped out his "What hath God wrought," than English scientists Charles Wheatstone and William Crooke came up with another kind of telegraph. Bell had barely asked Mr. Watson to "come here" before Elisha Gray produced a strikingly similar telephone.

I met here so many almost-simultaneous inventors, so many experimenters, developers, researchers, that those old plateaus of mine crumbled into a slope, a hillside leading up to higher knowledge. The exhibit has taught me that invention is not a dazzling step out of dark ignorance but a form of evolution—a grayness, gradually lightening.

Nowhere is this more evident than in that part of the show toward which I now pressed, the modern age of information. I didn't feel comfortable about my understanding of this, and I knew that those youngsters, panting at the door, would rush past me and take over all the computers and interactive videos unless I hurried.

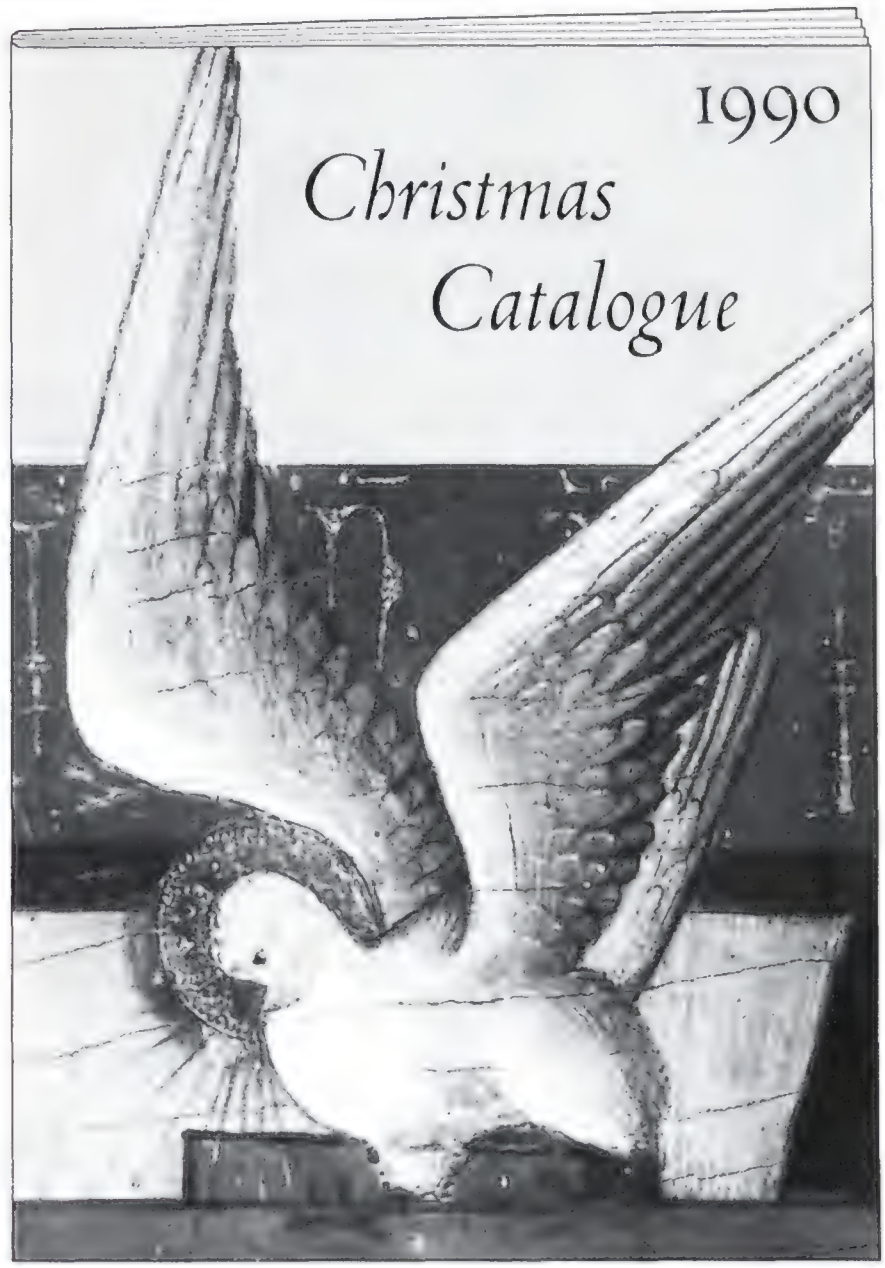
Speeding through the history section, I paid scant heed to the 1858 New York church service giving thanks for the newly laid Atlantic cable and barely nodded to the 1853 Scheutz Difference Engine, on which you solved math problems by turning a crank. I only glanced at the reconstructed wireless room of the doomed *Titanic*.

I even skimmed over the things I had known and loved in my own youth: an elegant Atwater Kent radio; a pneumatic tube that shuttled paperwork through an office; the street scene from 1939, chosen as a key year because of the New York World's Fair with its theme, "The World of Tomorrow."

Emerging from the confines of World War II, I faced the postwar era, just as I had actually done in 1945. Here the exhibit spreads out before the visitor the true "world of tomorrow." And though brilliantly encapsulated, I found it as hard to grasp as I had 45 years ago. The leaps of knowledge shown here, and experienced by my generation, were too huge, too quick to be explained by evolution's gentle nudge.

What I looked out on from this point in the exhibit reminded me of how I had first confronted the television explosion. With a journalist's ambivalence,

THE
METROPOLITAN
MUSEUM OF ART



Do your Christmas shopping at home with our new 144-page full-color catalogue of unusual and distinguished presents, *the majority of which are available only from the Museum*. The many wonderful gifts include jewelry, decorative works of art, sculpture, Christmas cards and Christmas ornaments, note cards, posters, and prize-winning art books priced from less than $10 to more than $100. There is also a special selection of presents for children.

The new Christmas catalogue will be mailed to you. Please send $1.00 to cover postage.

THE METROPOLITAN MUSEUM OF ART
255 Gracie Station, New York, NY 10028

1291

Name _____

Address _____ Apt. # _____

City _____ State _____ Zip _____

Own A Piece Of American History.

Shown actual size.

Original Mint Condition (MS-60) Saint-Gaudens Double Eagle, $485.

When Teddy Roosevelt commissioned sculptor Augustus Saint-Gaudens to design the magnificent Double Eagle $20 gold piece, little did he know that years later his cousin, Franklin, would have most of his "pet babies" melted down. Today, surviving Double Eagles are as rare and revered as the American bald eagle itself.

The gold in these extraordinary coins came from the thriving mines of the Old West. The dreams of our ancestors live on among collectors like you.

A Solid Investment Opportunity.

With an established record of lucrative long-term price increases, the Saint-Gaudens Double Eagle is an outstanding tangible asset investment for today's volatile economy. Now you can own one of these investment-grade, PCGS or NGC certified MS-60 uncirculated mint-condition coins for only $485, including shipping and handling.

Buy With Confidence.

Blanchard and Company is the nation's largest retailer of rare U.S. coins. And the only rare U.S. coins we sell are independently graded and certified by The Professional Coin Grading Service or Numismatic Guaranty Corporation. Furthermore, we will meet or beat any competitor's currently advertised prices, subject only to availability of the coins and verification of the competitor's offer.

Act While Supplies Last.

To order this or any other rare U.S. coin, call

1-800-877-7633

toll free today.

LIMIT ONE PER CUSTOMER
DATES OUR CHOICE. PRICES AND AVAILABILITY SUBJECT TO CHANGE WITH NO ADVANCE NOTICE

BLANCHARD

AMERICA'S RARE COIN FIRM

2400 Jefferson Highway
Jefferson, LA 70121-9927

ASK FOR OFFER #490

Papier-mâché figures by Stephen Hansen cheerfully caricature life in the Information Age, focus of a new exhibit at American History.

I had mourned the loss of *Collier's*, *Liberty* and other beloved magazines, here displayed, yet cheered the 1960 Kennedy-Nixon debates—politics in the living room—here viewed.

Dodging technicians, who were testing soundtracks, films and the movement of certain displays, I studied the interactive devices near the exit, tempted but too shy to try them. Then I went back to the giant UNIVAC I, marveling at its ability to foretell Eisenhower's big election win in 1952. For all their strange, contorted language, computers now seem endlessly resourceful. The National Crime Information Center used them to track down James Earl Ray, convicted assassin of Martin Luther King jr. I stared at Ray's enlarged fingerprint and decided not to analyze my own—which I was invited to do.

From UNIVAC I to the personal computer, capabilities have grown as size has diminished. I focused in, at last, on the PCs and other personal devices that fill a couple of shelves. I have a PC. I even know how to use it, though that's not to say I understand it. But I do understand its implications.

I have a printer hooked up to it, but I don't print out too often because I'm concerned about the overuse of paper. Also, mailing a printed manuscript can take too long for deadlines. Better to transmit by phone through a communications channel—like the one described here in the show. If that fails, I can always make a printout and send it instantly over my telephone fax machine, like the one in the case in front of me.

I don't have a pocket organizer, but probably could use one. And I haven't bothered with the software that would let my computer shop for me or plan my day. I still feel I can handle that. But I have a fine answering machine, and a copier, and. . . What I have, in fact, is a cottage industry. I can stay at home and produce work on my own machines. The Information Age has ushered me into a new way of life.

An automatic coffee maker kicks in at 5:15 every morning, so when the clock radio wakes me a half-hour later, I smell fresh-brewed coffee waiting. I listen to the news and weather, and go upstairs to the studio, cup in hand. A snap of three switches and I'm at work. Ordinarily, I work intensively for about six hours, with a half-hour out for breakfast. No wasted time commuting. No office chitchat. No conferences and seldom a visitor.

When this column is finished, I'll tell my wife that I need to use the phone for a few minutes. Then, through my computer, I'll call up the communications channel I subscribe to. With a few swipes at the keyboard, I'll transmit this text. A phone call to the magazine people will alert them that the July *Mall* is ready and waiting. Someone will tap some keys on one of their computers, and these words will magically appear on that SMITHSONIAN screen, ready to be printed out.

I will certainly be asked for some documented details to back up my copy. I'll

This Fourth of July
have something really impressive to display.

Tanqueray. A singular experience.

Imported English Gin, 47.3% Alc/Vol (94.6° ⊥ 100% Grain Neutral Spirits. © 1988 Scheffelin & Somerset Co., New York, N.Y.

COLUMBUS

You are invited to join in the 500th Anniversary of the Discovery of America by owning and displaying Christopher Columbus, the official statue commissioned by the United States Historical Society. Sculpted by the illustrious American artist Albert Petitto, the heroic figure is based on a contemporary portrait of Columbus. He stands proudly on a map of the world, bearing his sword from the Queen of Spain. Around the base of the statue is incised: *Christopher Columbus 1492 + 1992 Discovery of America.* This is the only statue that will carry the Quincentennial Seal, authorized and registered by the Society. Available in 8" bonded bronze, and 12" solid bronze.

As the owner of the Columbus statue, you will receive a Certificate of Authenticity, and your name will be entered permanently in the Quincentennial Archives of the Society.

I wish to acquire the Quincentennial Statue of Christopher Columbus.

___Please send ____ 8" bonded bronze statue(s) at $85 plus $3 for shipping.

___Please send the 12" solid bronze statue, an edition of 500 (limit 1), at $825.

Check enclosed for $_____.

Charge $_____to: ___VISA___MasterCard___Am. Ex.

No._____Exp. _____

Virginia residents add 4.5% sales tax

Thirty-day return privilege.

Name _____

Address _____

City/State/Zip _____

DaytimePhone _____

United States Historical Society

Dept. S9 • First and Main Streets • Richmond, Virginia 23219

Or, call toll-free: 1-800-446-7968

find them, turn on my fax machine, dial the magazine's fax number and run the pages through. A call tomorrow will probably point out an unclear bit in the column. Even though I'll be working on something else, I can quickly bring the text back on my screen to make the necessary changes and send it as before.

I accomplish about twice as much work as I did when I showed up at an office every day. No rush-hour gridlocks. No parking problems. No necktie. After lunch I stretch out for a 20-minute nap, work a bit, then knock off in time to get some exercise. I take a day off when I need it. An ideal life.

Or is it? The fact is, I miss the people at the office, the brainstorming, the wisecracks, the sharing of ideas, the harmless flirtations, even the conferences. I've thought of getting a video phone when they're readily available, but that wouldn't transmit a colleague's full presence. A humming computer is no substitute for a warm body.

Thankfully, I must often forsake my cottage to dig for an article or a column. I break away on assignments with joy in my heart. Called to the office, I gladly accept the day off and drive into Washington—but not, mind you, at rush hour.

That's how the Information Age has affected one person—myself. Others will find here what it's done to them. Make no mistake: curator David Allison has orchestrated one of the most superb shows I've ever experienced, anywhere. But most people leave it with the disturbing knowledge that Big Brother is indeed with us, his bland glass eye ever present, his voice all around.

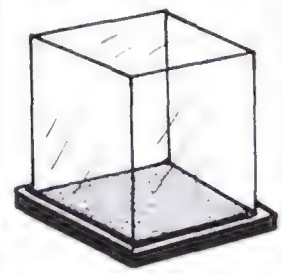
Yet isn't that the fault of the tired, smoggy, overpopulated world we live in? The Information Age has sprung inevitably from it. Perhaps it's scary for us oldsters, but it's the challenge of life to my grandchildren.

A rising tide of sound swirled around me and I turned away from the PCs to face the Invasion of the 21st-Century Kids. They chattered and squealed with delight at arcane electronics as familiar to them as the old Atwater Kent was to me. Confidently, they tried all the touch-screen interactive devices that I had approached so warily.

I walked out the exit without waiting to design a bike with a computer or even to get my bar code read and printed out. The kids had taken over—and so they should. This is their time.

Edwards Park

DISPLAY CASES



PROTECT AND DRAMATIZE YOUR PRECIOUS WORK OF ART

CUSTOM MADE

clear lucite on a finished wood base

SEND DIMENSIONS • LENGTH • WIDTH AND HEIGHT • WE WILL QUOTE PRICE

FOR ESTIMATE OR ADVICE

CALL 1-800-446-8558

OR WRITE

THE DISPLAY CASE CO.

Box 6808, Exmore, VA 23350

SATISFACTION GUARANTEED

Sterling Silver We Buy & Sell

Kirk Stieff specialists

Estate Flatware & Hollowware

for Free Price List 1-800-441-2520

Michael A. Merrill, Inc.

908 York Rd. Baltimore, MD 21204

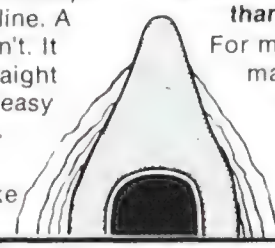
THE POKE BOAT®

IT'S EVERYTHING A CANOE ISN'T.

A canoe is tippy. A Poke Boat isn't. It's remarkably stable.

A canoe is hard to turn and difficult to keep in a straight line. A Poke Boat isn't. It stays in a straight line, yet it is easy to maneuver.

A canoe is heavy. A Poke Boat isn't.

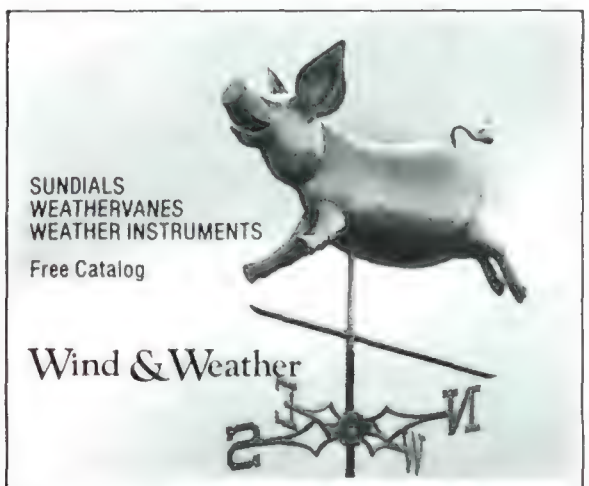


It **weighs only 28 pounds**-built with aircraft strength.

For under $700 you can buy more *than a canoe.*

For more information, give us a call.

Toll free 1-800-354-0190.



DOLPHIN BRACELET

#E-17, sterling: $68 ppd.

14K: $330 ppd.

7" long

8 gracefully sculptured dolphins are linked together to form this beautiful bracelet.

Gift boxed, satisfaction guar.

MC, VISA, AMEX, ck or M.O.

1-800-67-TORYS

M–F, 9–5, EST.

Catalog upon request.

TORY'S

106 Washington St., Dept. S, Marblehead, MA 01945

G'deal.

$949.* Now there's simply no excuse to miss all the famous Aussie sights. Because the fares Down Under just went down under. In fact, they're the very lowest prices in years.

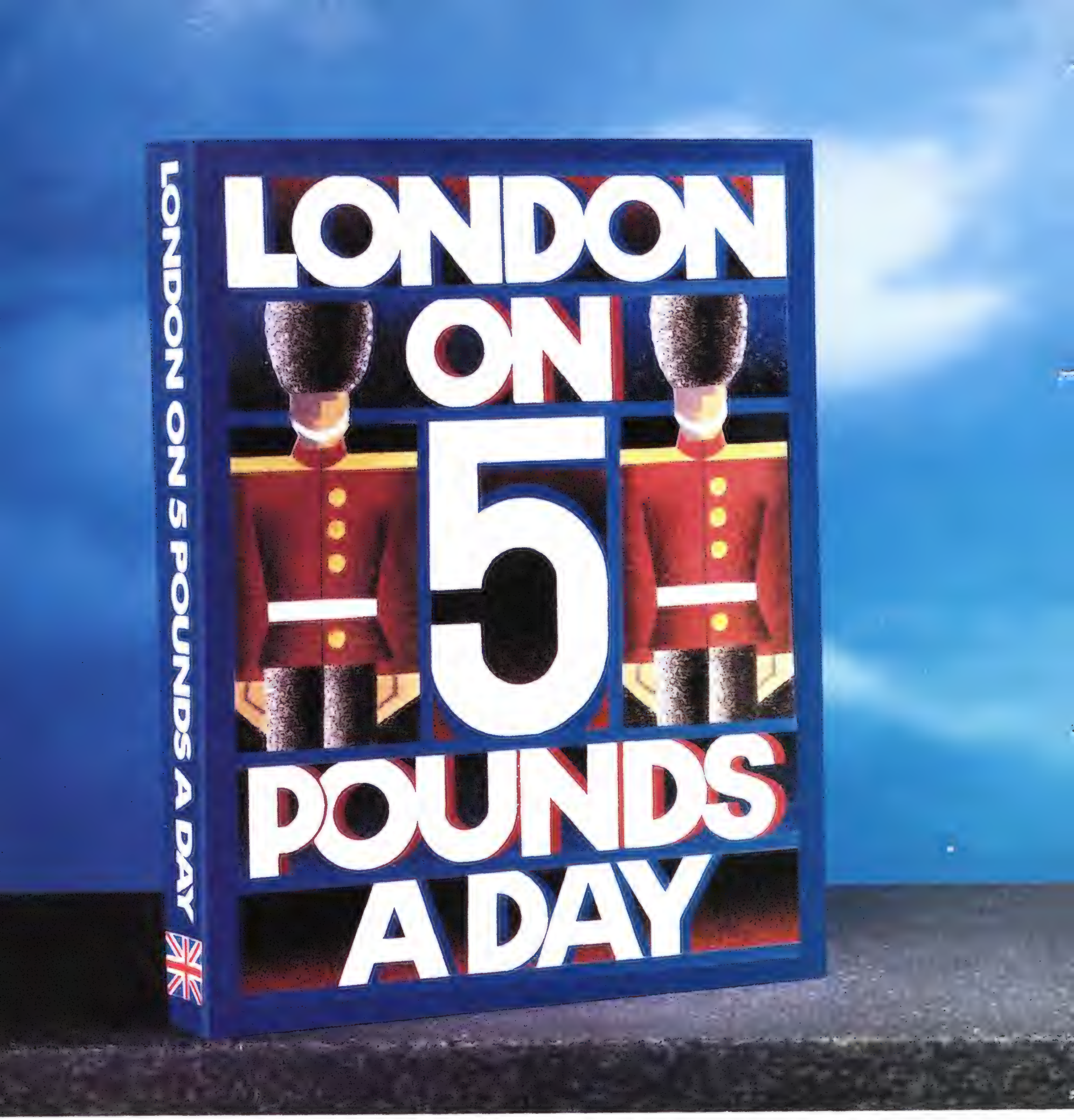
Our complete, 130-page "Destination Australia" book can tell you everything you need to know to plan a great Aussie holiday. Just call 1-800-288-8896, Dept. SM07 for your free copy. Also, don't forget to ask your travel agent about affordable vacation packages.

But you'd better hurry. Because with fares this low, there'll never be a better time to say "G'day."

Australia

There's never been a better time to say G'day.

*Based on San Francisco and Los Angeles service. Restrictions apply regarding availability of flights, seats, refunds, dates of purchase and travel. Fare subject to change. Other restrictions apply. See your travel agent for details.



Despite the optimism of the guidebook, it's tough to get around London with just 5 pounds in your pocket. But thanks to Sony, it's easy to take in London with less than 2 pounds in your hands.

Handycam®

In fact, the Sony Handycam® CCD-TR5, the world's smallest and lightest camcorder, weighs a scant 1 lb. 12 ounces.* But as convenient as it is to pack, it's also conveniently packed with features.

Wherever you go with your TR5, you have the luxury of 2 hours of recording time and 4 hours of playback instantly on any TV.† What's even more remarkable is the way you can catch all the action. And how simply.

There's auto focus, auto iris and auto white balance. So you can effortlessly capture subjects or even the Queen herself. Plus a 6:1 power zoom lens to preserve a panorama of Buckingham Palace, or the

© Copyright 1990 Sony Corporation of America. All rights reserved. Sony, Handycam, Flying Erase and Edit Search are trademarks of Sony.

London for under 2 pounds a day.

smile of your 6 year old in front of it.

We've also seen to it that you can shoot inside the Tower of London with amazing 4 lux low light sensitivity. Stop the flight of a cricket ball with a 6-speed shutter that responds up to 1/4000 of a second. Or title and date your videos with Digital Superimposing. And the Sony Handycam TR5 even has Edit Search™ for on-site editing and a Flying Erase™ head for glitch-free scene transitions.

It all adds up to a camcorder that does everything the big ones do. Pound for pound.

SONY

*Without tape or battery. †NTSC American Standard

Phenomena, comment and notes

In summer, people flock lemminglike to the beach, moved by an unknown drive, fully aware they will also have to confront a sea of humanity.

Science continually unveils the ocean's secrets, but just why it appeals to us is still a mystery

Despite the calendar or the schedule at the municipal pool, summer does not begin on June 21, much less Memorial Day. The real thing, the season when you feel your life force dripping off your skin, starts in July. These are the dog days, named by the ancient Egyptians for Sirius, the Dog Star, which rises before the sun in July and August. It's a bum rap. Real dogs do something about it. Trapped in a yard, they dig up the homeowner's most precious plants so they can lie in fresh, cool dirt. Given half a chance, however, they head for any water they can find, whether it be the kiddies' wading pool or the stream in back of the house.

Humans are not far behind. Come July they crowd the local pool, tube down the river, swim out to a raft at the lake. Most of all, they head for the ocean. A hefty percentage of Americans live within three hours of salt water and make repeated pilgrimages. The beach scene is an icon of summer! Toddlers playing like sanderlings in the wash; older siblings bodysurfing; parents holding infants high as they walk out through the breakers; assorted adults chatting as they bob up and down in shoulder-deep water; and always one or two solitary souls much farther out, steadily swimming parallel to the beach as though stroking their way on to the next port of call.

But the ocean, especially, is more than a place to cool off, to feel freshened and cleansed. People come to see the ocean, even in winter. In July they can immerse themselves in it or stalk its edges, picking up calcium carbonate objets d'art left behind by unseen creatures. Even though the concentration of salt in our blood is identical to that in seawater, poetic claims that we are drawn to our ancestral home seem farfetched. More likely we are refreshed by the energy, the immensity, the mystery. It is not entirely unlike going to religious services.

The ocean exerts a powerful pull even on those who have never seen it. Most people today associate Rachel Carson with the last book she published, *Silent Spring*, which is rightly seen as a turning point in our relationship with our environment. But her most powerful, moving writing shows up in her earlier books and articles on the sea, an extraordinary marriage of science and art.

As a child in western Pennsylvania, and as a student at what is now Chatham College in Pittsburgh, she had never seen the sea. But she had always yearned for it, and there came a moment when she knew it would be her life. In his literary biography *The House of Life: Rachel Carson at Work*, Paul Brooks quotes her on that moment: "Years ago on a night when rain and wind beat against the windows of my college dormitory room, a line from *Locksley Hall* burned itself into my mind—*For the mighty wind arises, roaring seaward, and I go.* I can still remember my intense emotional response as that line spoke to something within me, seeming to tell me that my own path led to the sea. . . ."

She did go, becoming a marine biologist, writing articles about the sea for a Baltimore newspaper, and eventually left us *Under the Sea Wind*, *The Sea Around Us* and *The Edge of the Sea*. Wherever I happen to be now, I can be teleported instantly to the ocean by simply opening the first pages of *Under the Sea Wind* and flying low over the barrier islands of North Carolina with Rynchops, the black skimmer, following his return from Yucatan:

"As he neared the shore of the island the skimmer drifted closer to the water, bringing his dark form into strong silhouette against the gray sheet, like the shadow of a great bird that passed unseen above. Yet so quietly did he approach that the sound of his wings, if sound there were, was lost in the whisper song of the water turning over the shells on the wet sand."

Some of the science has changed since these books were written. For example, in the opening pages of *The Sea Around Us*, published in 1951, Carson gives the age of Earth as about 2.5 billion years, the then commonly accepted figure. It is now reckoned to be closer to 4.5 billion years. Science is learning more about the oceans all the time, of course, from an armada of oceangoing research vessels and satellites in space.

The good news is that there still are surprises. Not many years ago scientific jaws dropped when commercial fishermen came up with a very large, new species of shark, quickly dubbed "megamouth." Some of the biggest news has to do with the very small. Last summer a report in *Nature*, the British scientific journal, made the front pages here. It seems that marine biologists, like galactic astronomers before the "discovery" of dark matter, had been unaware of just how large a proportion of the sea's biomass comprises viruses, bacteria, algae and protozoa. Most of the life in the oceans is too small to see. A teaspoonful of seawater may contain more than a billion viruses—10,000 to 10 million times more than previously estimated. The world ocean is what laboratory scientists would call a culture medium, the largest petri dish known to mankind.

Last April *Discover* summarized recent discoveries of whole new classes of phytoplankton, microscopic one-celled plants that float in the upper layers of the ocean. These are smaller than any previously known, only about 40-millionths of an inch across, and lack most of the usual structures of animal and plant cells, such as a nucleus. Like normal plants, however, they use the energy of sunlight, nutrients in the water and the carbon in carbon dioxide to build living matter.

There can be millions of individuals of a single species in an ounce of seawater, and presumably they play an enormous role in the planet's carbon cycle. Whether Earth undergoes the global warming the world is watching for may be decided by organisms we didn't know were there. As Bob Guillard of the Bigelow Laboratory of Ocean Sciences in Maine has observed: "A hundred years of oceanography, and the most abundant being in the world wasn't recognized by anybody."

The understanding of the sea provided by science increases our interest (see, for example, the article on fish schooling on page 88), but it is building on something already there. How many people feel a rising sense of anticipation as they get closer and closer to the ocean, sensing it through the light in the sky and the salt smell in the air?

Nearly everyone shares some of Rachel Carson's fascination with the place where land, water and sky meet. We stand in shallow water, the very edge of the sea, wet but still on the land. It is like standing on the prime meridian at the site of the old Royal Observatory in Greenwich, England. If you place one foot on either side of the brass line embedded in pavement there, you have one foot in the Eastern Hemisphere and one in the Western. At the beach a person can stand with one foot in the water and one on land, a colossus astride the history of living things.

Many of us are hopelessly attracted, wanting to penetrate the one-way mirror of the surface. We stare into the water from piers and seawalls. We walk the beaches, pausing to pick through the wrack along the high-tide line. We ease down the rounded slopes of granite or pick our way through the jungle gym of mangrove prop roots to reach a spot where we can see into the water. Mesmerized by the view from a bridge over a channel in a salt marsh, we watch the creatures of another world move in and out with the tidal currents.

Impossible to embrace it all. We are in the position of the character in a Fellini film sketch who falls in love with a woman on a billboard only to have her come to life, all 75 feet of her. If we consider the average depth of the oceans, forgetting entirely their area, we are a man about 6 feet high in love with a woman 12,000 feet tall; there is only so much we can humanly grasp at any one time.

We certainly try, however. Atlantic, Gulf and Pacific coasts offer plenty of opportunity. Rachel Carson estimated that, if you include all the places in just the continental United States where the water rises and falls on the tides, there are more than 50,000 miles of shoreline. If all the citizens of those 48 states were to head for the shore on the same day and stand equidistant, each of them would have a foot of space. On some days at some beaches, it feels like everyone *has* come. One begins to fear that the nation's interior stands empty, lifeless under the July sun.

At the end of a perfect day, there is salt on our sunburned skin, sand and seaweed in our bathing suit, shell cuts on our feet. Plastic buckets are filled with shells, whelk egg cases, polished stones. As the sun goes down and the breeze comes up it is possible, huddled in a wet towel, to shiver in July. Parental query: "What'll we do tomorrow?" Spontaneous answering chorus: "Let's go to the beach."

John P. Wiley jr.

Victoria's Jubilee Silver Crown

The 1887-1892 "Queen Victoria" Silver Crown of Great Britain

Only **$39**

Own this famous Queen Victoria silver crown, struck at the height of the British Empire's glory.

Late in her reign Victoria ruled over the largest empire in history, with vastly more subjects than even the Russian Czar — and her magnificent silver crown contains almost 50% more silver than Czar Nicholas II's big silver rouble. In its time, the sun never set on this impressive silver coin, used in commerce throughout the Empire. Yet comparatively few were minted, so our well-preserved specimens are genuinely scarce today.

This short-lived Victoria portrait was struck for the 50th anniversary of her reign (Golden Jubilee). On the reverse is Pistrucci's famous "St. George and the Dragon" engraving. Our choice of dates. Each coin contains 28.2759 grams of .925 silver, substantially more than U.S Morgan silver dollars of the period, of which more than 100 times as many were struck. While limited supplies last, your price for our guaranteed Fine to Very Fine quality is just $39 each postpaid or 3 for $112. **Order #13037. To order by credit card, call toll-free 1-800-451-4463 anytime.** Or send your check or money order to: **International Coins & Currency, Inc., 11 E. State St., Box 218, Dept. 1534, Montpelier, VT 05601. Money-back guarantee: 30-day home examination.**

1991 Four-Do
Open one up.

Open here and feel what it's like to have 4-wheel anti-lock brakes and a shift-on-the-fly 4x4.

Open here to view the biggest and most powerful V6 in its class.

THE *Heartbeat* OF AMERICA IS WINNING

or S-10 Blazer.

America's best-loved sport utility vehicle just got bigger.

S-10 Blazer's always open for adventure, now in a new 4-door model. Bigger than ever before. With 25% more cargo room, and 100% more doors. Available seating for 5. Two- or 4-wheel drive. Plus all the abilities that keep Blazer the leader. Nobody's winning like The Heartbeat of America.

BUMPER TO BUMPER PLUS
3 YEAR/50,000 MILE WARRANTY

See your Chevrolet dealer for terms of this limited warranty. Chevrolet, the Chevrolet emblem, S-10 and Blazer are registered trademarks of the GM Corp. ©1990 GM Corp. All Rights Reserved.
Let's get it together...buckle up.

Open here and see how easy getting into America's most popular sport utility vehicle can be.

Open here for 25% more cargo room.

TODAY'S TRUCK IS CHEVROLET™

By Rudolph Chelminski

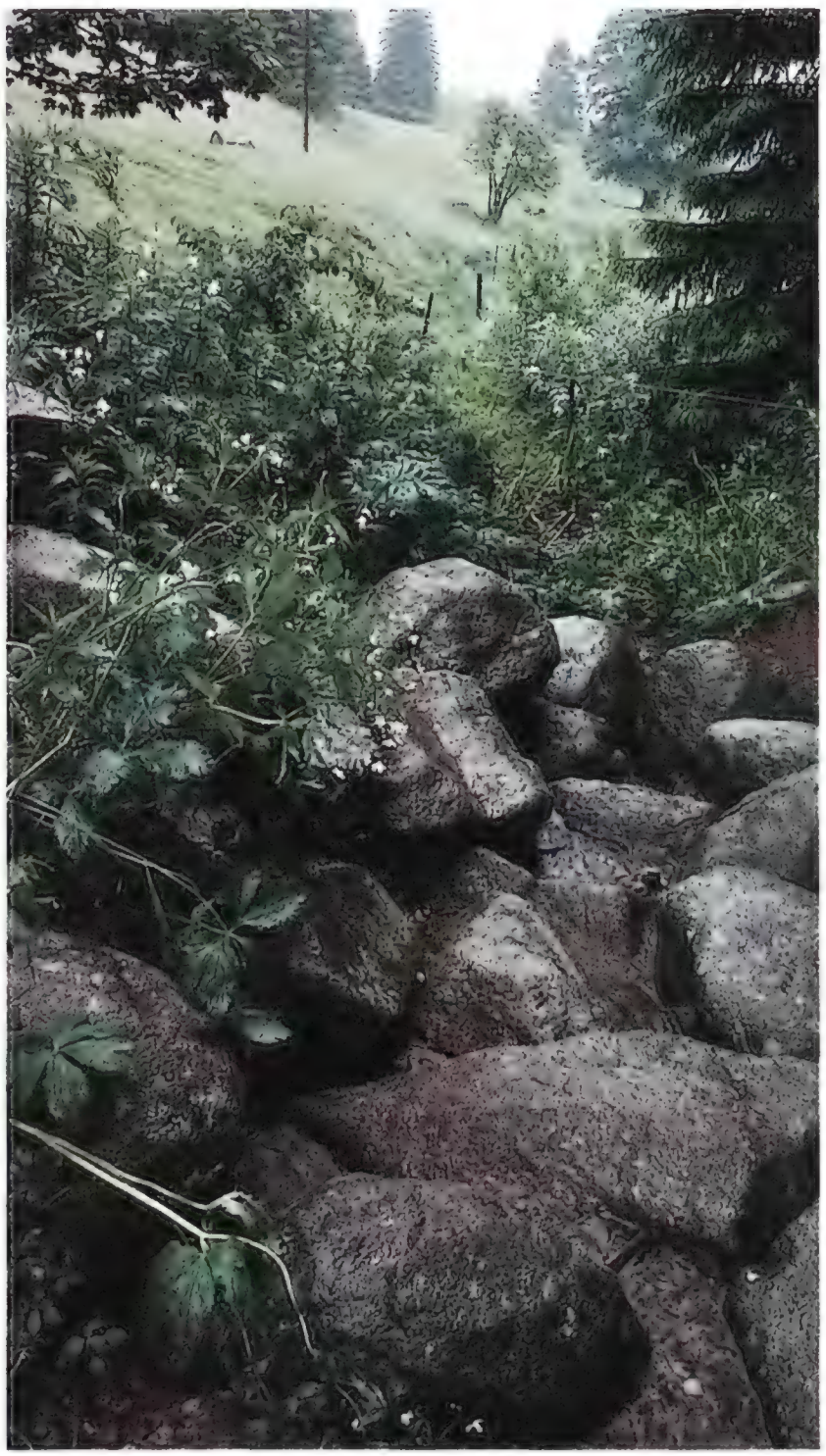
The not-so-blue Danube: a storied link between Europes old and new

When the Main-Danube Canal opens in 1992, trade and tourists will begin to travel by boat from the North Sea to the Black Sea

It was the day after Christmas 1989, and it was just about the first time in anyone's memory that the Friendship Bridge had really lived up to its name. Nearly a mile and a half of cantilevered blue-gray iron, the second-longest bridge in Europe, it stretches from Ruse to Giurgiu, and if those names don't happen to ring any bells for you, try this: Friendship Bridge is the main connection between Bulgaria and Romania, and the river it spans is the Danube.

Friendly, indeed, it was that Boxing Day, because the news was just out that President Nicolae Ceauşescu (who called himself the "Genius of the Carpathians," the "Danube of Thought") had been executed. As a consequence, the first phase of the Romanian Revolution had well and truly carried the day. At the exact midpoint of the bridge, two young soldiers in ill-fitting winter uniforms, Kalashnikovs and double-strapped Romanian helmets smiled and made the V-for-Victory sign as our car approached, then positively beamed with pleasure when they were offered a pack of American cigarettes, still a reliable currency for everyday transactions in Romania.

With me in the little rented car from Sofia was Iskra, a representative of the Bulgarian oppositionist organization Eco-Glasnost, an outfit whose idealistic name alone suffices to outline its politico-ecological goals ("Purity everywhere, in everything," she had announced earlier, "and equality in all parties"). And as we drove from checkpoint to checkpoint toward Bucharest she hardly ever dropped her own right hand

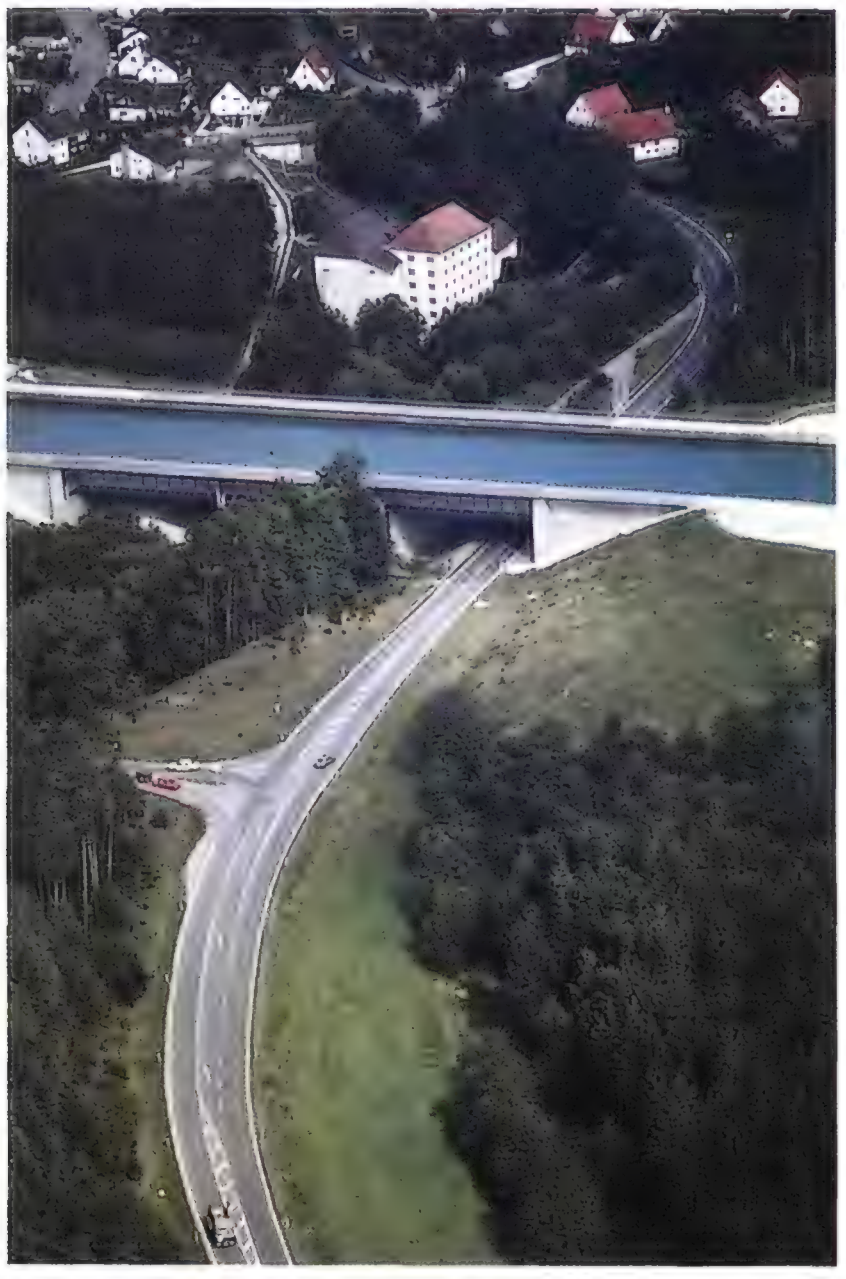


Rocky spring in West Germany's Black Forest is source of Breg, which joins the Brigach to form the Danube.

Still in Germany but already a big river, Danube cuts through rugged limestone cliffs and does a slow roll past Benedictine monastery of Weltenburg near Kelheim and its junction with Main-Danube Canal.

Photographs by Pierre Boulat/Cosmos

Map shows site of new Main-Danube Canal, and water route up Rhine from Rotterdam, down Danube past Linz, Vienna, Bratislava, Budapest, Belgrade and Tulcea, to the Black Sea. River flows 1,770 miles through seven countries, with a population of 150 million, before touching corner of USSR. Danube-Black Sea Canal provides ships with useful shortcut.



South of Nürnberg, halfway to the Danube, new canal becomes aqueduct over West German autobahn.

for the "V" that she was perpetually flashing in the direction of any Romanians she could espy. And they all flashed it back, too. The camaraderie was quite overwhelming.

Also quite uncharacteristic. A Slavic culture on one side (Bulgaria), a Latin-derived one on the other (Romania), the two nations have spent a good deal of their time mutually ignoring each other and generally feeling one's culture to be superior to the other's. There have been occasional punch-ups, too, as in the Second Balkan War and World War I, but in this moment of revolutionary euphoria all that was forgotten. Now Iskra the Bulgarian had hitched a ride with me to carry to the Romanians on the other side of the river clothing and medicines she had scrounged around Ruse, on the basis of the only factor likely to create amity, however brief, between two disparate Balkan peoples: a shared loathing of Communism.

The fact that we had just crossed the Danube on this mission was nicely symbolic, because if ever a river represented the rivalries, contradictions, complications and diversity of the Middle European experience, it is this one. Partly for that reason, if ever a river had a

Blazing with industry in the night, smokestacks and blast furnaces of the Austrian city of Linz give the river one of its first big doses of the pollution that increases steadily as it flows farther eastward.

chance to help the New Europe work, commercially and culturally, it is the historic Danube.

Something like 1,770 miles in length, it flows through and serves no fewer than eight sovereign nations (West Germany, Austria, Hungary, Czechoslovakia, Yugoslavia, Romania, Bulgaria and the Soviet Union). Not to mention a mind-blowing collection of present and past ethnic groups and civilizations, some of which once formed states themselves and—who knows—could do so again in the future. You remember all about the Ottoman empire, of course, and probably Bosnia and Herzegovina, too, but what about Serbia and Slovakia and Montenegro and Macedonia and Dalmatia and Croatia and Transylvania and Moldavia and Dacia? It was no accident that the Balkans became a universal byword for labyrinthine human complications.

The Mississippi is about 600 miles longer than the Danube, but you can order exactly the same double burger in exactly the same language from one end to the other. On the Danube, the languages change no fewer than seven times, and its very name changes six times, beginning with "Donau" in West Germany's Black Forest and ending with "Dunay" in the Soviet Union at the Black Sea.

By way of nourishment, the Danubian equivalent of the double burger might begin near the river's source in West Germany as a titanic *Bauernschmaus* (about half a pig lying atop a steaming heap of sauerkraut), move on to pastries, chocolate and *Schlag* in Vienna, blood-red paprika stews in Hungary, lamb with yogurt in Bulgaria, quasi-French dishes in Romania, and finally vodka and shashlik by the corner of the delta that lies within the Soviet Union. The architecture along the way will mutate from Gothic cathedrals to little onion-domed churches to Turkish minarets to Socialist-modern horrors built scarcely 20 years ago and already candidates for demolition.

As Europe's one great west-to-east river, the Danube was the primitive highway to the Orient. Christian crusaders cruised down it toward the Holy Land to fight Muslims. Muslim zealots or just plain marauders

Rudolph Chelminski, who has been reporting from Europe for more than 20 years, wrote last for the SMITHSONIAN *about France's famous* Guide Michelin.

moved east to west into Europe from the Black Sea and Turkey, the steppes of Central Asia, or even all the way from Mongolia.

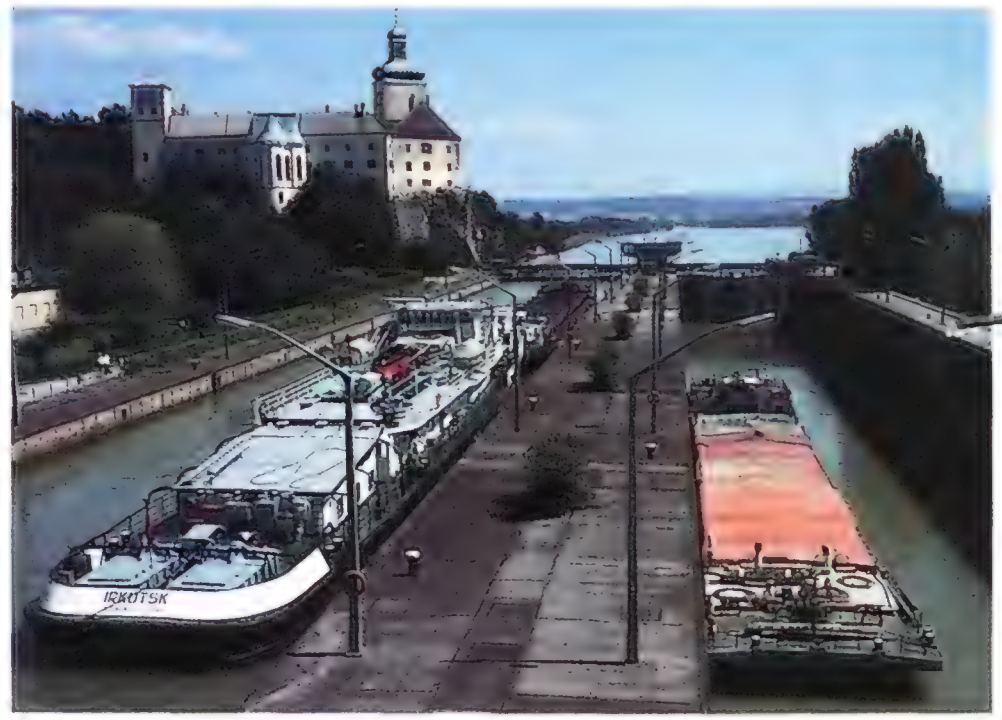
Pre-Christian Greeks plied that highway, too, as did the later Byzantines, Goths, Huns, Avars and other similarly bellicose tourists. The Romans chose the Danube as their *limes*, the boundary between their empire and the barbarians. They studded the banks with fortifications and stout stone watchtowers, many of which survive in more or less vestigial form today, while patrolling its channels with their earlier versions of the U.S. Marine gunboats that prowled the Mekong.

From Attila's time in the fifth century, through the Slavic expansion into the Balkans, the great push of the Ottoman empire, the rise and fall of the Hapsburg empire, the Germanic emigrations, the Napoleonic imperialism, the revolutionary struggles of the mid-19th century, right up to the two world wars and Stalin's imposition of Communism on Eastern Europe, the Danube has been both the site and the instrument (transporter of troops and matériel) of so many battles that a map of its route reads like a military atlas.

It is ironic that a river with such a reputation starts so peacefully and prettily. Europeans being Europeans, there are three different versions of its true source, but all of them lie within the Hänsel-and-Gretel decor of Germany's Schwarzwald, or Black Forest, where there are more cuckoo clocks per square mile than pickup trucks in Missouri, even if the gingerbread houses are rare.

Taking up this problem in his recent book *Danube*, Italian author and literary historian Claudio Magris first checked out the official "source" on the grounds of the ancestral Fürstenberg castle at Donaueschingen, with its no-nonsense sign: *Hier entspringt die Donau* (The Donau starts here). In fact, Donaueschingen's most plausible claim to the genesis of the great river

Tulcea is last port city on the Danube before it splits into vast delta area of marshes and sandbars.



At one of dozens of locks needed to negotiate Danube, Soviet riverboat and gravel barge lie side by side.

Here travelers await passage to the Black Sea, or set out in small excursion boats to explore delta area.

Ferry brings trippers over the river from Hungary's cathedral city of Esztergom to Czechoslovakia.

lies in the fact that two little rivers, the Breg and the Brigach, come together there, then flow away in merged form as the uncontested Danube. But what about the sources of the Breg and Brigach? That's where matters become European again. The Brigach is a pretty stream and has local advocates. But the Breg is the longer of the two, farther from the Black Sea and hence, its supporters say, the true source of the Danube.

The little Breg begins its life near the town of Furtwangen. It was there that Magris set out in pursuit of a scientific friend's tale concerning the gutter of an 18th-century house. It was purportedly fed by a basin in its kitchen that was in turn filled to perpetual overflowing by a tap that no one had ever been able to turn off. Following the stream uphill toward its mountain meadow birthplace, Magris found the "gutter." It turned out to be a hollowed-out log used to direct water from a lead pipe fed by the same spring as the pool on the hillside below that feeds the Breg. A dead end, but like so much of the lore that has grown up about the river, the bizarre intricacies involved made a story too good not to be used.

Conveniently transplanted to Transylvania

Consider the case of Vlad Ţepeş (1431?-1476), prince of the Danubian principality of Walachia, who became known as Vlad the Impaler for his habit of forcing his enemies to sit on sharpened stakes. The son of Prince Vlad Dracul (Vlad the Devil), Vlad Ţepeş was also known as Dracula, or Son of the Devil. Inspired by such appellations, author Bram Stoker created the vampire of his 1897 best-selling novel, conveniently transplanting him to the Danubian province of Transylvania.

Chilling fantasy, of course. But recent research in Canada has suggested that in the Middle Ages large numbers of people may have suffered from a chronic blood disease. Its symptoms were emaciation, drum-tight lips and gums, protuberant teeth, and a sensitivity to the sun so severe that it caused sufferers to sleep by day and go a-wandering by night—presumably in search of the fresh blood that seemed to give them some relief.

It was ambitious dictator Nicolae Ceauşescu who six years ago inaugurated one of the four major engineering projects with which the Danube has been saddled in postwar times. All four of them represent concrete, modern responses to a dream of merchants and freebooters that dates at least from the time of the Vikings: unfettered trading across Europe from west to east via a single waterway. With the easing of the Cold War, the advent of the New Europe in 1992 and the soon-to-be-completed Main-Danube Canal providing a link between the mouth of the Rhine and the Black Sea, the Danube has the opportunity to fulfill that dream—

Emptying into Black Sea, Danube has no single mouth. Many channels like this carry water, silt and debris.

Important shipping aid, opened in 1986, is 40-mile canal from Cernavodă in Romania to the Black Sea.

becoming a steadily greater artery binding East and West together.

The Rhine, entered at the great Dutch port of Rotterdam, has long carried boats upstream to Mainz, where the river Main flows into it. Though the Rhine then continues almost due south toward Switzerland, the Main curls east by way of Frankfurt and Schweinfurt. From Bamberg on the Main to Regensburg, the Danube's northernmost point, it is only 80 miles as the crow flies.

The first to try his hand at linking the two rivers was none other than Charlemagne. In 793, he began work on his "Fossa Carolina," a canal that was designed to join a tributary of the Danube to a tributary of the Main. The ditch had to be abandoned after only a little more than a mile was dug, but the idea remained as seductive as ever during succeeding centuries. In 1837 King Ludwig I of Bavaria, a patron of the arts and of dancer Lola Montez, set some 6,000 workers digging. Nine years later he had a full-blown canal, 106 miles long and nearly 5 feet deep, between the Main and the Danube. It was slow going—no fewer than 101 locks were needed to bring the horse-towed barges yard by yard over the high points—but the Ludwigskanal was state of the art for its time.

Unfortunately for Ludwig, a more modern form of state-of-the-art transportation—the railroad—was just then coming into strength. Although the Ludwigskanal was still used for shipping until the 1940s, it was unable to compete in speed with the train. Nevertheless, the idea of trading by water through the heart of Europe from the North Sea to the Black Sea persisted. So did the idea of making the Danube a river fully navigable by large vessels.

The river's most intractable obstacle to heavy shipping was the Iron Gate, a terrifying caldron at the edge of the Carpathian Mountains, where the river passed through the corset of Europe's deepest gorge and narrowed to a width of only 433 feet as it dropped toward the Walachian and Danubian plains in a series of five spectacular cataracts.

In the 1890s, a 1.5-mile canal was built along the river's right bank, allowing ships to bypass the Gate. In the early 1960s, Romania and Yugoslavia began work on a joint project to speed up traffic by further taming the watery monster. The dam and hydroelectric plant at Djerdap, called Iron Gate I, was finished in 1972 and later complemented by a second dam, lower down, known as Iron Gate II. Where waters once boiled, and boats had to be painfully winched up rapids, the Danube is now backed up into a long, placid lake, attainable by two deep locks. What has disappeared in the way of savage beauty has been gained in kilowatt-hours, and aquatic parking lots for diesel-powered barges. The

Fishermen cruise wild Danube delta, a labyrinth of lakes and meanders, and a refuge for water birds.

U.S. Army Corps of Engineers would surely approve.

Ceauşescu's contribution to Danube navigation came later. It was the Danube-Black Sea Canal, a 40-mile cut through the Romanian lowlands from the river at Cernavodă to the new port of Constanţa. The canal provides boats with a shortcut to avoid the enormous Danube delta and the myriad meanders that precede it, thus saving some 150 miles of slow steaming. Completed in 1984, it was dug largely by political prisoners and conscripts of the Romanian Army.

The canal constituted "the most representative of the great constructions of our country's period of powerful expansion—'the Ceauşescu Epoch,'" gushed a deluxe handout from that period, lavishly illustrated with pictures of the canal and a baby-faced Ceauşescu. The great man followed up this triumph by ordering the army to dig a second canal between the Danube and his landlocked capital, Bucharest. The army thanked him by siding with the revolutionaries in December 1989, and then executing the "Great Conductor" by firing squad.

Even more ambitious than Ceauşescu's pharaonic projects was the enormous Gabčikovo-Nagymaros river barrage system, a 124-mile-long complex that includes a 23-square-mile artificial lake, dams, hydroelectric plants and a diversion canal. The project was jointly planned and built by Czechoslovakia and Hungary between 1977 and 1989. Conceived in the feverish '50s, when the Stalinist school of gigantism was at its apogee (lakes emptied, rivers reversed and such) it gave not a moment's thought to ecology, history or esthetics. The crown jewel of the plan was a colossal concrete bathtub some 15.5 miles long, snaking aboveground through the Slovakian countryside southeast of Bratislava. Up to 60 feet tall and 900-2,000 feet wide, the bathtub was to be nothing less than a new Danube, a diversion canal rerouting the river around the shallows lying approximately halfway between Budapest and Vienna. Never again, those early planners vowed, would heavy-laden coal and gravel barges be held up by sandbanks or summer low-water periods.

Trouble was, the giant project threatened to dry up one of Europe's last great river wetlands, a unique ecosystem nourishing some 5,000 species of birds, mammals, fish, insects and reptiles. Heaven knows, Johann Strauss the Younger to the contrary, the Danube was never blue—it varies from yellowish to a translucent brown. But the outflow from the shallow storage lakes for the hydroelectric plants, replete with raw sewage from Bratislava and elsewhere, bid fair not to improve its complexion. More important, it was argued, the project would also threaten Europe's greatest reserve of underground fresh water. Just as certainly, rerouting the river would dry up the region's

most fertile farmland. And finally, if the lower dam at Nagymaros were put into operation, the whole Danube Bend area, home of the Arpad dynasty and some of Hungary's most important archaeological sites, risked being flooded.

It wasn't.

Faced with escalating construction costs and strong opposition from the democratic forces that eventually forced the Communists from power last March, the Hungarian Parliament voted in November 1989 to suspend work on the project, and canceled entirely the dam and electric plant at Nagymaros on the Danube Bend. The Czechoslovaks were furious—they had virtually finished their side of the project, and the bathtub was ready for filling—but without Hungary's Nagymaros dam the full original plan could not be carried through. At last word the standoff was unresolved. The Czechoslovaks considered the project to be partially salvageable, while the Hungarians were busy with the more important business of building a new democracy. Environmentalists in Hungary want to turn the area into an internationally supervised park. Perhaps a compromise will be found, but until then the bathtub remains mournfully empty, and the ecologists breathe easier.

The most successful of the great earth-moving projects on the Danube is the Main-Danube Waterway, more commonly known in German as the Wasserstrasse, or "water street." Begun during the 1920s, and now directed by a consortium led by the Federal Republic of Germany, the project covers a total distance of 420 miles and, in addition to its centerpiece, the Main-Danube Canal, includes the canalization of parts of the Main and Danube rivers, as well as the construction of several hydroelectric plants. Following the approximate line of the Ludwigskanal, the digging began on the Main-Danube Canal 30 years ago. Now all but the last miles of the 100-mile linkup are finished. A modern high-capacity waterway 130 to 180 feet wide and 13 feet deep, it will be able to accommodate "Europe ships" of up to 2,000 tons and two-unit push-barges of up to 3,600 tons each.

Where the Ludwigskanal required 101 locks, this one needs only 16, the deepest locks lifting ships 82 feet at a shot. So prudently were plans laid that a brief outcry of opposition from environmentalists—the Greens—died when the consortium demonstrated that, far from damaging the ecosystem and creating pollution, the canal would actually help clean some of Germany's already polluted rivers by bringing in purer water from the Danube.

"We had a Ministry of Landscape Planning and Nature Protection ten years before the Greens even existed," Florian Stumfall, the consortium spokesman, told me with suitably dismissive hauteur in his Munich office. "In the Riedenburg-Kelheim section alone, nature protection cost us some 75 million deutsche marks, or 15 percent of the total budget. The Greens are never happy."

Regarding the most recently completed sections of the modern canal, at any rate, it is difficult to argue with Stumfall. Curving gracefully around villages, loafing under clifftop castles and punctuated with numerous fish-rich lakes, it is indeed quite lovely, with

The modern look of the old Danube is nowhere more streamlined than it is here, on Black Sea canal, near the Romanian port of Constanţa. There large containers from heavy-laden ships can be off-loaded into barges for the next step in voyage upriver.

REFLECTIONS OF GRANDEUR.

To send a gift of Grand Marnier® Liqueur (except where prohibited by law) call 1-800-243-3787.
Product of France. Made with fine cognac brandy 40% alc/vol (80 proof). © 1989 Carillon Importers, Ltd., Teaneck, NJ.

Near the Romanian town of Zimmicea, where every factory has its own orchestra, violinist Illif Victo and accordionist Serban Flurea and his singer wife Niculina rehearse together on the sandy shores of the river.

Elegant city of Budapest with its graceful bridges and filigreed Parliament building, bestrides the now stately Danube about halfway to sea, giving river ambience and, alas, spewing raw sewage into it as well.

waterside footpaths and bicycle tracks that should make it a tourist's paradise. Far from being an eyesore, it looks for all the world like a venerable old river, thoughtfully provided with enough picturesque villages and country inns to support an entire picture-postcard industry. The U.S. Army Corps of Engineers would not approve.

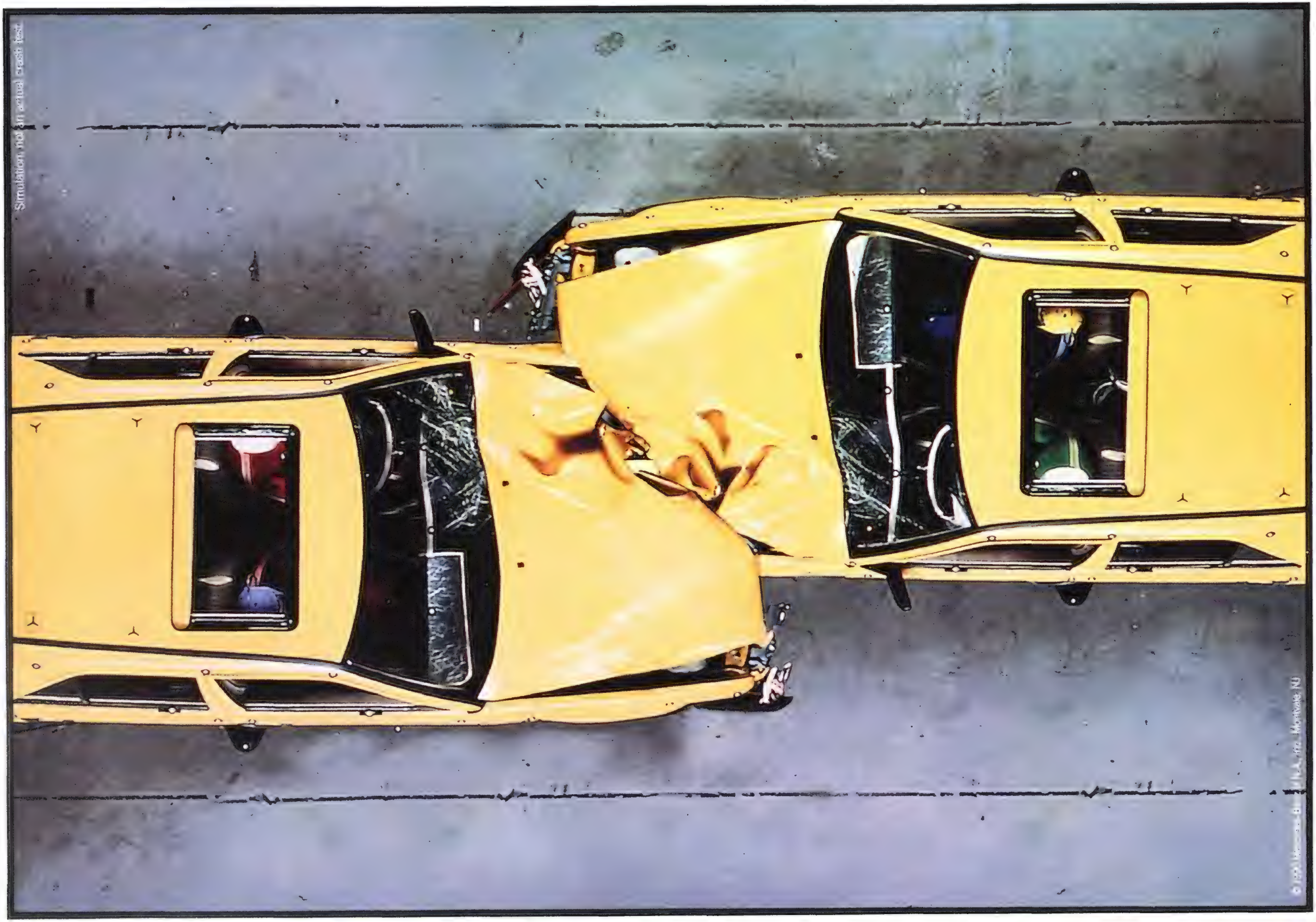
Even so, the Greens were right to raise the alarm as a matter of principle. The 20th century has inflicted such a plethora of hydroelectric and flood-control projects on the Danube—most notably in Austria—that for miles on end it has all the charm of an industrial basin. Besides, concern for the Danube's environment has also been a unifying force among the people of the disparate cultures that live along the river's length.

By 1992, when the Main-Danube construction people have tidied up, the canal will open for business and the ancient dream of the Vikings will have become reality: from North Sea to Black Sea, 2,175 miles of clear waterway, ready for the shipping trade and tourism. One likes to imagine cheeses from Holland and Bulgarian tomatoes, lace from Brussels and paprika from Hungary zipping back and forth. But most of the trade won't be very romantic stuff: barges are slow, limited almost exclusively to petroleum products, construction materials and similarly awkward, heavy loads—gravel travel.

Where greater speed is required, the ancient saltwater route via the Bosporus, the Mediterranean, the Strait of Gibraltar and the Atlantic will still do the job twice as fast (two weeks versus four). And of course trucks (SMITHSONIAN, November 1986) and planes will still be unbeatable for perishables. Even so, the consortium's directors have calculated that the Wasserstrasse's considerably lower shipping costs should make it a profitable venture.

Considerably more exciting for travelers are the tourist prospects made possible by the canal. The German and Austrian companies that operate cruises on the Danube—as well as the Dutch and Swiss who work the Rhine—are already planning the long Rotterdam-to-Constanta route as a trans-European novelty for their luxurious hotel ships. As commerce, tourism and democracy mutually nudge one another in the direction of the future, optimists unashamedly predict a new era of rapprochement between East and West. And with the crumbling of the Iron Curtain, the possibility of reduced tariffs, further improvements in navigability, and the changes needed for the countries of Eastern Europe to produce goods salable in Western markets, the continuing dream of the "beautifully flowing" Danube as a conduit of culture and commerce looks promising.

Disabused old Mitteleuropa hands still have doubts, though. French shipping companies are already grumbling about the menace from the East, with barges from what used to be known as the Soviet bloc countries creeping up the Main-Danube Canal like dollar-eating viruses to offer bargain freight prices within the previously protected waters of Western Europe. And barely six weeks after my euphoric crossing of the Friendship Bridge, sporadic violence began to break out against ethnic Hungarians in the Romanian province of Transylvania.


Simulation, not an actual crash test

The perfect accident?

The front left corner of the northbound car has abruptly met the front left corner of the southbound car in an offset frontal impact.

If two cars had to meet this way, how fortunate that they were both Mercedes. Because every new Mercedes-Benz has been designed from the drawing board up with this specific type of crash in mind.

Mercedes-Benz studies show that serious accidents far more often involve offset than direct head-on impacts. So the forward chassis and body structure of a Mercedes-Benz is ingeniously configured to absorb, channel and distribute impact forces in *both* offset and head-on collisions. Aiming to blunt the thrust of kinetic energy before it reaches the passenger area. Aiming to reduce the occupants' risk of serious injury.

Even with this defense against offset impacts, the absolutely no-risk, no-damage, no-injury accident is, and probably always will be, unattainable.

But that has never discouraged the engineers of Mercedes-Benz from trying. And never will.

For further information on Mercedes-Benz safety, call 1-800-243-9292 anytime.

ENGINEERED LIKE NO OTHER CAR IN THE WORLD

THE TRUTH ABOUT AMERICA'S FORESTS.

Today America has over 20% *more* trees than it had just twenty years ago. And the numbers are growing daily, with trees being replenished faster than they are harvested in every region of the country.

Thanks, in part, to private landowners and America's forest products companies,

Boise Cascade · Bowater, Inc. · Champion International · Consolidated Papers, Inc. · Gaylord Container Corp. · Georgia-Pacific · International Paper · ITT Rayonier · James River

© 1990 American Forest Council

who plant over 6,000,000 trees a day, reseed entire forests, and use other forest management techniques to promote natural regrowth.

We're determined to keep up with the growing demand for wood and paper products. And to make sure our forests are a continuing source of joy for every American.

To help us manage the future of America's forests, mail this coupon or call 1-800-648-6699.

Name _____

Address _____

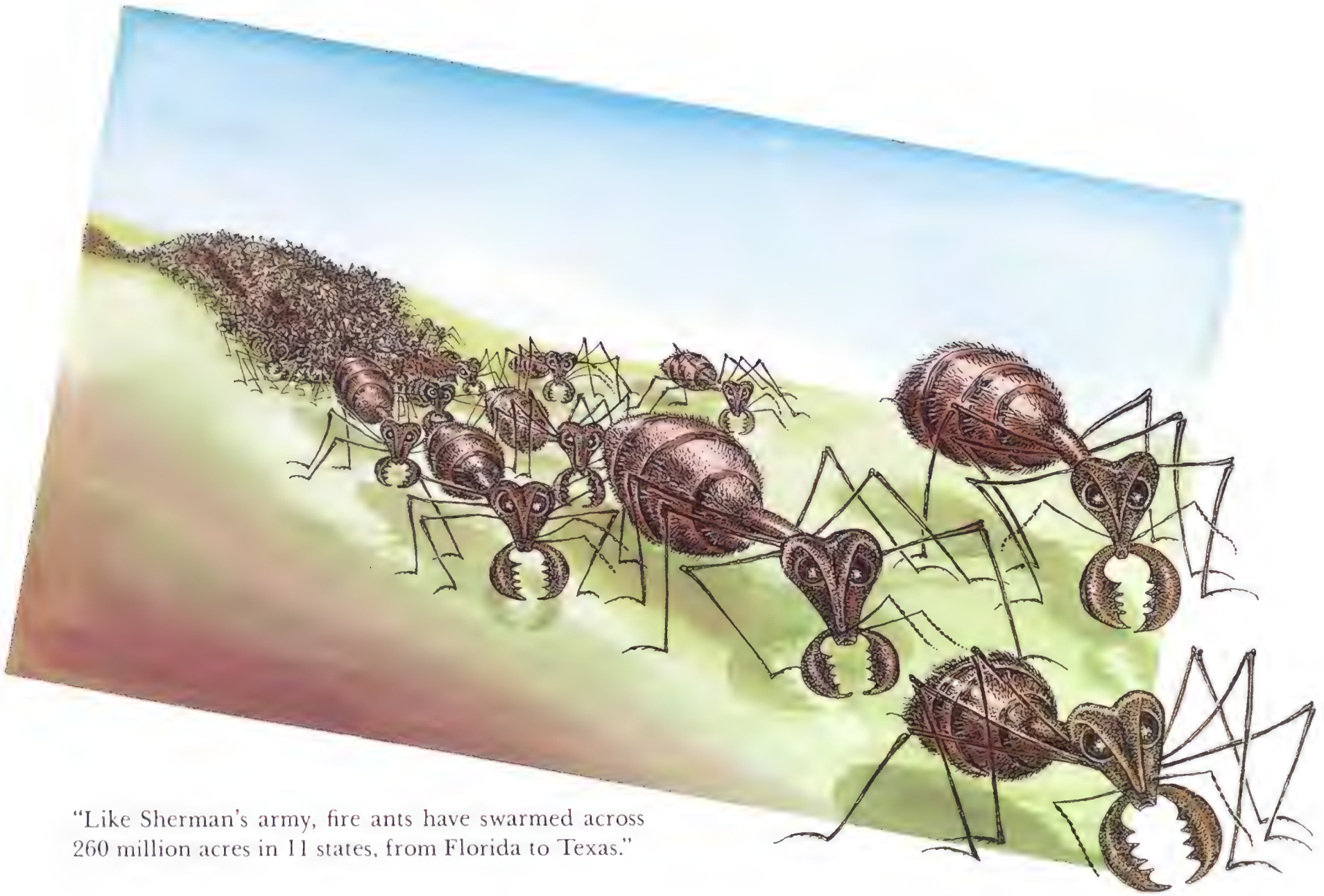
City _____ State _____ Zip _____

1250 Connecticut Avenue, N.W., Washington, DC 20036

AMERICAN FOREST COUNCIL

MANAGING THE FUTURE OF AMERICA'S FORESTS.

CORP. MEAD CORP. PACKAGING CORP. OF AMERICA POTLATCH SCOTT PAPER CO. SIMPSON TIMBER TEMPLE-INLAND UNION CAMP CORP. WEYERHAEUSER WILLAMETTE INDUSTRIES



"Like Sherman's army, fire ants have swarmed across 260 million acres in 11 states, from Florida to Texas."

By Richard Conniff

You never know what the fire ant is going to do next

But whatever it is probably won't be nice. After winning the wars we waged on it, this immigrant pest is acting weirder than ever

You know something has insinuated itself immortally into modern American culture when somebody tries to make a tourist attraction out of it. It doesn't matter how awful the object in question may be. The town of Marshall, Texas, for example, has put itself on the map with an annual celebration of the fire ant, a nasty little bug with an almost mythic reputation as a deerslayer, a man-killer, a molester of costly agricultural machinery. Among other gala events, a local booster proudly informed me, the festival features a fire ant roundup. What you do, see, is kick a fire ant mound and then, as the ants come seething up, you try to direct them into a bottle, which is kind of like smashing a hive and trying to round up the bees. One recent contestant claimed to have corralled 330 fire ants and suffered 170 stings. There is also a fire-ant-calling contest, a Miss Fire Ant beauty competition and a theme song: "A fire ant'll bite everything in sight / without so much as a by-your-leave. / They'll scare your kids and make your dogs uptight / and make you question all that you be-*leeve*." A manufacturer of a fire ant poison sponsors the event. The sales message subtly incorporated into

the theme song is that without this product fire ants would "get us all." Meanwhile, hey, why not have some fun?

As a cultural icon, the fire ant qualifies even more eminently on a second count, which is that politicians have long recognized this creature as an intensely emotional issue and they've ridden it hard. Since fire ants arrived here accidentally from South America sometime before World War II, they have spread, in the podium-thumping rhetoric of old campaign speeches, like Sherman's army, like a biblical plague, like the red tide of Communism, across 260 million acres in 11 states, from Florida to Texas. At the moment, they are threatening to break out of the South and provide demagogic raw material in New Mexico, Arizona and California. Last year, these "imported" fire ants (so called to distinguish them from North America's far less aggressive native fire ants) turned up along the Rio Grande, which is expected to serve as their detour around arid West Texas. They also hitchhike West by truck almost daily, and in 1988 they set up shop around Phoenix (where they have been exterminated) and in Santa Barbara (where they are still in business).

Fire ants are a tempting issue because they bedevil such an array of constituents. Their mounds, which average 12-18 inches in height, are a form of agricultural acne and a blemish on suburban lawns. Forty mounds to the acre is a typical infestation, but in the past decade a new, improved version of the fire ant has achieved densities of 400 mounds per acre across large areas of Texas. The ants can damage crops, and their mounds bend and foul costly field machinery. Though no study has ever authenticated it, farmers have charged for decades that fire ants sometimes kill newborn calves. In Texas, where one magazine has dubbed the insect "the ant from hell," they swarm over fawns bedded down by their mothers; when a fawn tries to lick them off, they sting it even inside its stomach, where autopsies have found them in the hundreds.

Fire ants also sting people—three million to five million Americans a year, by one estimate. They will climb any foot that is left for a few seconds in the wrong spot. As one expert attests: "It's very embarrassing to be at a church social and have to remove your pants due to fire ants." Fire ants sometimes turn up indoors, in clothes hampers and even beds. They can swarm over electrical equipment and shut down traffic signals, airport runway lights and those essentials of couch-potato civilization, air conditioners and televisions. Fewer than 1 percent of sting victims suffer an allergic reaction requiring medical attention, but toddlers who've fallen on fire ant mounds have sometimes died from stings, as have hyperallergenic adults. Such cases are extremely rare and hard to document, a drawback that does not keep worried parents from hyperventilating over the imagined peril in their own backyards.

The trouble with using the fire ant as a political issue is that it can backfire on you. The Texas Commissioner of Agriculture discovered this while cam-

"Now they're threatening to break out of the South. Last year the ants turned up along the Rio Grande. They also hitchhike West by truck almost daily; in 1988 the ants set up shop around Phoenix, briefly, and Santa Barbara (where they are still in business)."

Illustrations by John Huehnergarth

paigning for reelection in 1982. In search of a good television visual, he stuck his hand into a fire ant mound and held it there while expounding on his promise to "whip" the fire ant with chemicals. Then he did it again for another camera crew, a gesture so contrary to common sense that Texas voters rose up in righteous, itching horror to turn the poor fellow out of office.

The issue can also backfire because, in truth, there has never been a good way to whip *Solenopsis invicta.* It has proved itself without equal in its ability to make fools of politicians, bureaucrats and ingenious inventors who thought they could vanquish it. In the 1950s, the U.S. Department of Agriculture (USDA) declared fire ants a menace to crops in the Southeast and sprayed the pesticide heptachlor across 27 million acres. That killed a lot of fire ants. It also killed a lot of birds, reptiles, mammals and fish.

The program became one of Rachel Carson's chief targets in *Silent Spring,* the 1962 pesticide exposé that helped set the stage for the environmental movement. The USDA responded with "the perfect pesticide," Mirex, which it said would eradicate the fire ant without harming wildlife or leaving residues in farm products. After 16 years, during which bombers sprayed the stuff over 139 million acres, researchers persuaded the government that Mirex was a potent killer of crustaceans and also a possible carcinogen that accumulates as it moves up the food chain, concentrating wonderfully, as it happens, in human fat tissue. Thus ended what ant expert and sociobiologist E. O. Wilson called "the Vietnam of entomology."

It now appears that the USDA's efforts may have helped to *spread* fire ants, at a cost to taxpayers of $172 million over 24 years. By indiscriminately killing

"The USDA's pesticide program may have helped to *spread* fire ants, at a cost to taxpayers of $172 million."

"Their mounds, a form of agricultural acne, are up to 18 inches high and can foul costly field machinery."

all ant species, including some that prey on fire ant queens, pesticides like heptachlor and Mirex seem merely to have cleared the field for the invader, which colonized all the newly vacated niches. An additional irony (and ironies abound with these insects) is that while fire ants are undoubtedly an agricultural pest, they were never so demoniacally destructive as official lore suggested. At the USDA fire ant research center in Gainesville, Florida, they are quick nowadays to supply a list of Florida's agricultural pests, on which our villain ranks 22d in economic impact, down with chinch bugs and leafhoppers. Because fire ants eat other pests, notably the sugarcane borer and the boll weevil, farmers in some areas actually regard them as beneficial.

The failed war on fire ants produced widespread frustration, but American ingenuity rose to the occasion with a host of environmentally safe new ways to win. The McCoy Ant Stomper, for example, used a windmill to drive a small wheel around a circular track, killing any ant dumb enough to get in its path. Other popular remedies gratified what Mark Trostle of the Texas Department of Agriculture calls the KCK factor—the human need to "kick, cuss and kill." Entrepreneurs sold devices designed to suck fire ants out of their mounds or to incinerate them in their underground tunnels.

Among home remedies, dry grits were said to swell up in the ant's digestive tract and "bloat them to death." (Scientists demur: fire ants have sieves in their throats that filter out morsels at the submicron level,

including individual grits.) Another home remedy, requiring a certain loose knowledge of fire ant territoriality, was to shovel one mound on top of another, so the rival colonies would sting each other to death. Less erudite but arguably more gratifying was the practice, fairly common in certain circles, of drinking Lone Star beer and urinating on a fire ant mound.

The failure of Mirex had one genuinely beneficial result. It produced a belated interest in learning how fire ants really live, if only to kill them more effectively. In the past decade, the imported fire ant has become the most carefully studied of the 15,000 ant species in the world. It has been researched, with the help of advanced scientific technology, down to the composition of its mitochondrial DNA.

Some of the most sophisticated work has come from a Florida State University researcher named Walter Tschinkel, whose preferred research instrument is a short-handled shovel. Tschinkel, a 49-year-old with thick brown hair and deep-set eyes, takes a pure, tinkering delight in his ants. It vexes him a bit when the only question people ask is if he's come up with a surefire way to kill them. ("Put an ant on a brick," he advises, if pushed, "and take a hammer . . .")

Tschinkel has done much of his fieldwork at a half-finished housing tract not far from his office in downtown Tallahassee, and he drove me there one day early this year. Fire ants, like other "weed" species, prefer areas that have been disturbed by development. One

"Because fire ants eat other pests, notably the boll weevil, farmers in some areas think they're beneficial."

"Politicians have long recognized the fire ant as an intensely emotional issue and they've ridden it hard."

reason they've spread so rapidly through the South is their knack for colonizing nurseries and sod farms, and then traveling with the merchandise whenever it's delivered to a new construction site.

In the middle of a weedy field, Tschinkel quickly found a mound and sliced into its sunny side with his shovel. "Let's see if we can find a queen," he said, breaking up clumps of earth and spreading the fire ants out across a flat piece of ground. He paused occasionally to shake the swarming insects off his hand before they could sting him.

Fire ant queens mate only once, early in their lives, in a gaudy nuptial flight hundreds of feet in the air. The males promptly die (presumably happy). Inseminated females by the hundreds or thousands find their way to sites like this tract, typically within a half-mile of their birthplace, and here they get on with the main business of living. They shed their wings, dig in and try to establish a colony through nonstop reproduction. According to Tschinkel, 99 percent of these would-be queens fail, starving to death or becoming tidbits in the diets of kingbirds, armadillos, ants or other predators.

As many as 15 inseminated fire ant females may cooperate in the effort to found a colony. It is a kind of sociobiological Russian roulette, since eventually their offspring will execute all but one of them, producing the standard single-queen colony. Among many challenges the new colony will face is brood-raiding by other new colonies, and the one with the most workers—probably the one with the largest number of cooperating queens—usually wins.

Tschinkel once witnessed a megaraid at his study

"It's very embarrassing to be at a church social and then to have to remove your pants due to fire ants."

site. It involved 80 colonies and lasted 35 days. It began in pandemonium, surging back and forth across a 100-foot-wide battlefield with everybody stealing everybody else's eggs and larvae. Gradually, weaker colonies collapsed into larger ones. At the end of the carnage, one fat, happy colony survived, and after five years it was still going strong.

"There she is!" Tschinkel announced, pointing to a tangle of ants from the mound he had just opened up. In the middle, the three-eighths-inch-long queen seemed to float on her jostling attendants like a bloated Egyptian idol in a Cecil B. DeMille spectacular. The workers, innocuous-looking creatures less than one-eighth inch long, played patty-cake on her flanks with their antennae, picking up chemical messages and attending to her needs. "The term 'queen' gives entirely the wrong impression," Tschinkel told me, plucking her out of the tangle. She was not a ruler, he said, but a reproducer, a fire ant assembly line through which the workers constantly sluiced food to produce eggs. She was capable of laying 100 to 200 eggs per hour—a daily output equal to her own body weight, sustained for perhaps six years.

In Tschinkel's hand, separated from her nestmates, the queen was listless and immobile. But as we watched, eggs continued to pump out, tiny spheres sliding down her stinger. Automatically, she anointed them with her venom, which conveys chemical messages and may also have an antibacterial effect. "Poor thing," he said, putting her back in the mound, to be caught up again in a sea of attendants.

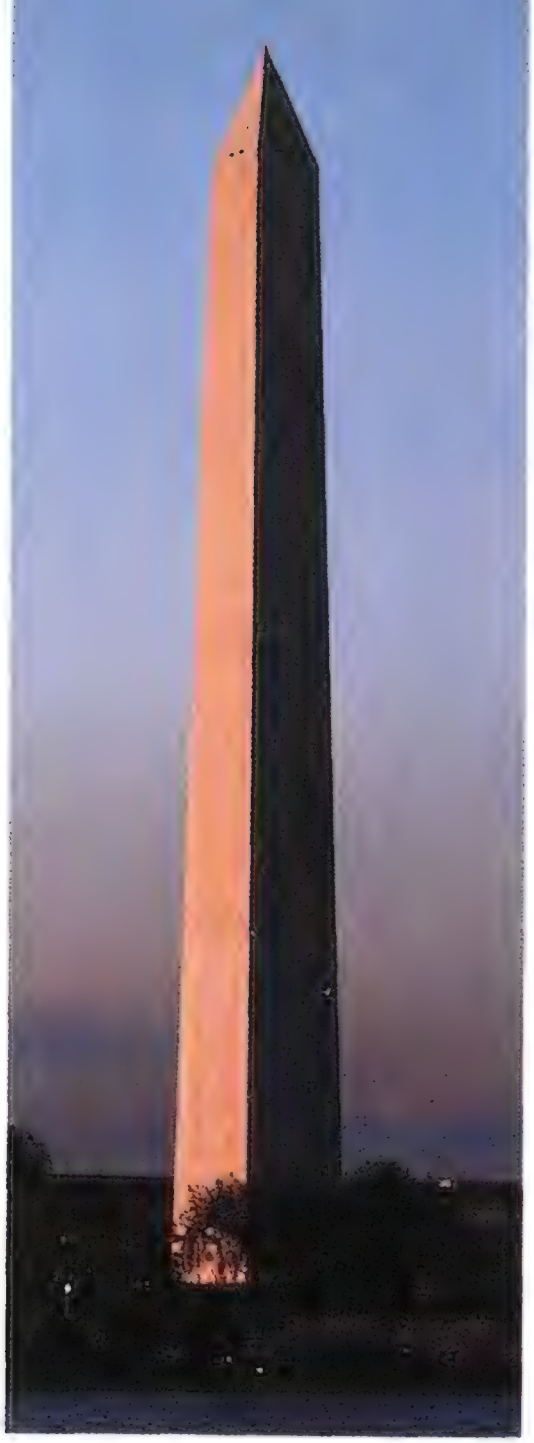
Killing the queen is the ultimate object of most fire ant research (Tschinkel's to the contrary), and it has never been an easy task. The colony's nest is almost entirely below the surface, a jumble of chambers arranged like subterranean apartments around multiple elevator shafts, often running six feet underground. The colony moves up and down according to temperature, water level and other factors. To further complicate the situation, the queen never goes out. Indeed, only the oldest and most expendable 10 to 20 percent of her offspring leave the nest to search for food.

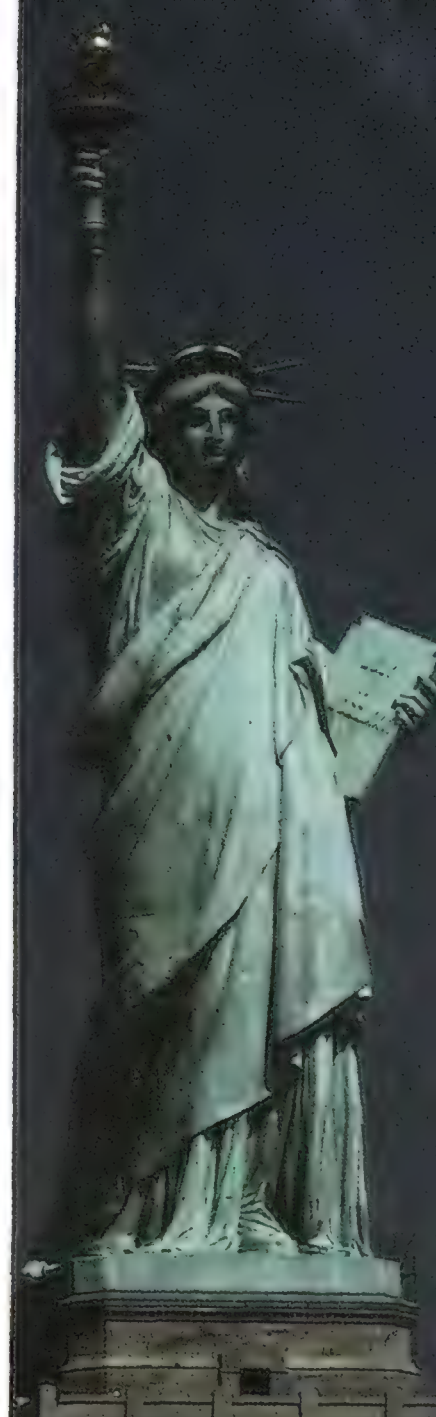
The foragers exit through horizontal tunnels radiating out as much as 130 feet, and they cover the adjacent territory to a distance of about 50 to 100 feet with a looping pattern that can be dismayingly efficient. (In Texas, they frequently get to highway accident victims before the ambulance.) If they find a substantial food source, such as a juicy worm or someone's picnic, they make a beeline back to the nest, navigating off the sun or moon and laying down a chemical trail for other foragers to follow. They share the food with the homebodies in the nest by regurgitating it so it can be licked or sucked from their mouth parts. The recipients in turn regurgitate part of that meal for their unfed cohorts until everyone is equally full, or empty. It sounds and is disgusting, but it makes for quick, even distribution of food while at the same time buffering the queen and her brood from any dietary indiscretion. Thus, to get to the queen, an effective fire ant poison needs to have delayed action, over three days or more. Yet it must also be short-lived, for environmental reasons. And it should kill only imported fire ants.

In the aftermath of Mirex, natural controls seemed like the most promising area for new research. One explanation for the fire ant's extraordinary success in this country was the phenomenon of "biological release": the insect was liberated from the checks and balances of its native habitat. Like any traveler in a new country, it was suddenly free to eat, drink, make love, be merry. It had neither friends nor enemies. USDA researchers in Gainesville began looking up its old acquaintances in the hope of introducing some of them to restore order. In the past decade, they have identified more than a dozen possibilities in the fire ant's native range, a 1,500-mile strip running from Rio de Janeiro up into central Brazil. Unfortunately, none of them so far appears likely to be successfully transplanted to the United States.

Other researchers have sought to produce the per-

Richard Conniff's most recent assignments for SMITHSONIAN *have included articles on tropical fish, roller coasters and the Connecticut River.*





GREAT AMERICAN LANDMARKS

Like the majestic structures that grace our national landscape, rural electrification stands as a living tribute to America's can-do spirit.

Owned by the people themselves, rural electric cooperatives bring power and opportunity to the countryside.

With power lines spanning three-quarters of the nation's land, and with a tradition of leadership in community action, rural electrics are a solid part of America's economic foundation . . . a landmark of human achievement.

America's Consumer-Owned Rural Electric Systems

A Power In The Land

National Rural Electric Cooperative Association • 1800 Massachusetts Ave., N.W. • Washington, D.C. 20036 • Telephone (202) 857-9500

fect toxic bait by combining it with the ant's own pheromones. These chemical messages are by definition attractive only to the species that produces them. In Gainesville, a slight, scholarly chemical ecologist named Bob Vander Meer has analyzed the pheromones of *Solenopsis invicta* with gas chromatography and has reproduced them artificially. On the wall of his laboratory is a poster with a photograph of two patches of paper. One, impregnated with the fire ant's trail pheromone, swarms with foragers; the other, untreated, is almost empty. Vander Meer aims to combine the pheromone with existing poisons, so that only imported fire ants pick them up. But he doesn't yet know if it will be possible to synthesize the pheromone in quantity at a reasonable cost.

A visitor to almost any fire ant research program in the country comes away with a sense of frustration. But if the researchers gripe about the politicians, their budgets and even one another (nobody seems to think the other guy's approach has a hope in hell), they share a grudging admiration for the fire ant itself, which has been outsmarting them for 40 years. "You think you've got it all figured out," says one scientist, "and then it turns around and does something weird on you." In short, the fire ant need not fear for its future.

Close encounter of the ant kind

I live in Connecticut, where we don't have firsthand knowledge of the fire ant, and a lot of friendly Southerners suggested that it might be an educational experience for me to apply some vital part of my anatomy to a fire ant mound and just see. I gave this proposal serious consideration, but in the end I decided not to stick my hand in a fire ant mound, on the theory that a working journalist should strive to be no more than half as dumb as a politician seeking office. What I did instead was to put my hand and some fire ants under a microscope.

Magnified 63 times, a fire ant looks monstrous and hairy. At the end of its segmented body, its uplifted hind end twitches angrily. Its head is broad and glossy, with poppy-seed eyes at the sides. Its antennae paddle the air. Each of its two serrated mandibles looks like the thicker half of a lobster's claw.

At the same magnification, the back of my hand looked like Jello shrink-wrapped in polyethylene. Here and there, black hairs stuck up like arrow shafts. Fire ants roamed through this wilderness, and having determined by subtle chemical analysis that I wasn't a nestmate, stung me at will. The only trouble was finding them through the microscope and then holding my hand still enough to keep them in focus. Finally, I saw one wander into view. It grabbed hold of some skin with its mandibles, tucked its hind end under like a dog about to do its business and zapped me. Then it pulled out the stinger (which is a smooth lancet, not serrated like a honeybee's), stepped one pace to the side and started to let me have it again, at which point I moved.

It was worse than a mosquito bite but nowhere near as bad as a wasp sting. On a scale of relative sting pain prepared by welt-covered USDA scientists, a Costa Rican ant known as the "bullet" (because you feel as if you've been shot) rates a five, the honeybee a three, the fire ant, despite its name, a mere one or two. This is far milder than even one of our own homegrown species,

"The term 'fire ant queen' gives entirely the wrong impression. She's not a ruler, she's a reproducer."

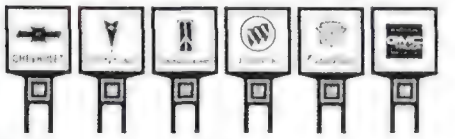
Fast. Or Free. Guaranteed.

When you drive into your GM dealership for a Mr. Goodwrench Quick Lube Plus, you know you'll get three things: Good parts. Good 'n fast. And a good price.

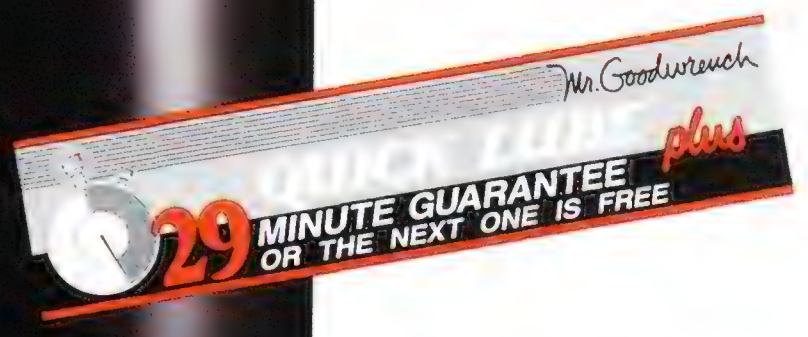
Mr. Goodwrench uses GM Goodwrench Motor Oil and AC Oil Filters. The right weight of oil for your kind of weather. And the right oil filter for your kind of engine. Plus, you get a complete 10-point maintenance check.

You also get Mr. Goodwrench's *Fast or Free Guarantee:* *If you're not in and out in 29 minutes or less, your next oil and lube is free.**

Mr. Goodwrench Quick Lube Plus. Now at participating General Motors dealerships, wherever you see these signs.



Now at GM Dealerships.



the harvester ant (a four), with which the Apaches sometimes used to amuse their prisoners.

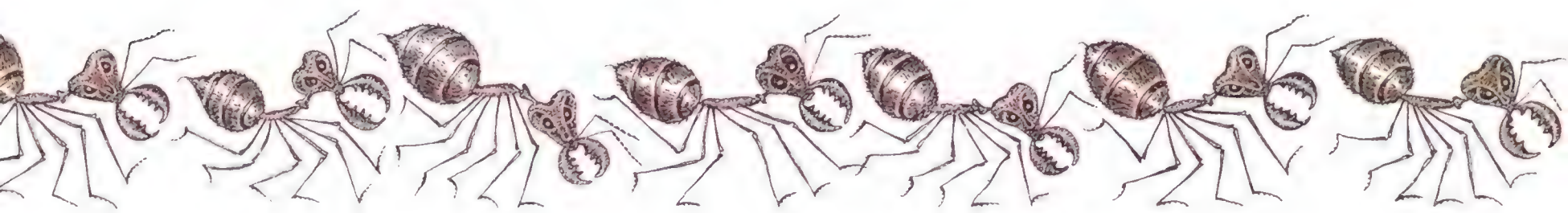
Does this mean the fire ant peril is a canard? Unfortunately, no. The rating scheme doesn't take quantity into account, and quantity is the fire ant's great strength. It is probably less common to get a single fire ant sting than 10 or 20 at a time, and even if the pain passes quickly, a splotch of itchy yellow pustules usually results. Brad Vinson, an entomologist at Texas A & M University, attributes the highly emotional reaction of most victims less to the sting than to these pustules. They can persist for a week or more on a child's arm—an ugly memento mori to anxious parents—and though the pustules are sterile, scratching often leads to secondary infections.

Quantity, even superabundance, has become a particularly sensitive issue with imported fire ants in the past few decades, as the species has once again turned around and done something weird. In 1973, a USDA researcher named Mike Glancey was digging up some nests in Hurley, Mississippi, when he came across a phenomenon no one had ever reported before. Instead of one queen, there were "20 or 30 big fat girls without wings that looked like queens," and instead of executing these pretenders to the throne, "the ants were tending them, surrounding them, protecting them." He dubbed the nest "queen city" and wrote it up. The scientific community responded with disbelief until 1980, when reports of other multiple-queen colonies began to come in. Some colonies had 300 queens, all laying eggs, all packed together in unheard-of densities. In one extreme case, parts of a field were infested at a rate of 22.6 million fire ants per acre—518 individuals per square foot.

In truth, quantity has always been the chief distinction between imported fire ants and our native fire ants. Native fire ants typically occur at densities of only four to five mounds per acre. The single-queen imported fire ant builds ten times as many, an increase horrifying enough to provoke a 20-year pesticide war. Hence the alarmed public reaction to the advent of multiple-queen colonies, which represent yet another tenfold increase.

Texas is the only state where multiple-queen colonies predominate. The mounds there are sometimes so close together, according to the USDA's Sanford Porter, that if you're light-footed and dim-witted enough, "you can practically hopscotch across your yard on fire ant mounds like a frog on lily pads." Not only are the colonies close together, but they also lack the old territoriality. They appear to share food and they no longer automatically massacre any intruder not chemically labeled as a nestmate. Dump one colony onto another and they will probably send out for beer. The mounds function, in effect, as a single supercolony, which may be an acre or more in size. Walter Tschinkel, customarily skeptical and understated, calls the development of the multiple-queen form a "stunning change in biology."

This change may extend not just to the fire ant itself but to its habitat as well. In one study, Sanford Porter clocked the time it took ants in the wild to locate baits he set out. In areas with native ants, the first foragers showed up in two minutes. In multiple-queen areas with imported ants, it took just 20 seconds, a rate of efficiency with dismaying implications for other animals in the habitat. When multiple-queen fire ants entered his study plots, Porter found that the number of native ant species dwindled from 15 to 5. It was the first solid evidence for a troubling impression a lot of Texans have been getting lately—that multiple-queen fire ants may be simplifying the environment, stripping



away biodiversity. "Texas," wrote Porter, "may be in the midst of a genuine biological revolution. . . ."

Anecdotal evidence abounds. Birders have discovered fire ants climbing into nests to eat bluebird hatchlings. Small-mammal researchers have learned to treat live traps with pesticide because if they don't, says one scientist, fire ants "will strip an animal overnight."

The trouble with anecdotal evidence is that one dead mouse or even a hundred dead fawns don't necessarily add up to a species in trouble. One of the original arguments for using heptachlor in the 1950s was that imported fire ants were wiping out bobwhites and other quail. It developed afterward that fire ants, unlike heptachlor, mainly killed unhealthy chicks. The fire ants were, in other words, just another agent of natural selection.

Thus the fire ant, a creature with a millimeter-size brain, has Texas on the horns of a king-size dilemma: Does it make sense to treat critical wildlife habitat broadly and aggressively, risking the ill effects inherent in any pesticide campaign? Or is it wiser to wait for conclusive evidence of a new "silent spring," at which point it may be too late?

The National Audubon Society, a longstanding opponent of irresponsible pesticide use, recently brought its own fire ant problem to the Texas Department of Agriculture. The department has become known, since its fire-ant-induced change of management in 1982, for its enlightened approach; it speaks not of eradicating fire ant populations, but of *managing* them. In practice, this means getting people to suppress the urge to kick, cuss and kill, in favor of slower-acting but more-effective remedies—notably the use of a growth regulator that renders queens incapable of egg production. It means persuading them to live with native fire ants as a stopgap against imported species and to leave single-queen imports alone lest a multiple-queen supercolony replace them.

Audubon was concerned because imported fire ants on its refuge islands near Corpus Christi were killing hatchlings of the brown pelican, a threatened species. Caretakers could actually watch it happening, and death by fire ant is appalling even when the victim is a lowly mealworm. In some areas hatchling losses were estimated at 50 to 60 percent. The Texas Department of Agriculture sent out a team to do a survey. It recommended using a pesticide to knock down the imported fire ants, which were concentrated in the nesting area, but not to go after native fire ants minding their business elsewhere. "You don't understand," the Audubon man replied. "We want the ants *off the island.*" In the end, the enlightened approach prevailed. A man from Agriculture treated imported fire ants with a pesticide, in the nesting area only, enabling the pelicans to get on with their breeding.

Is it any wonder that fire ants drive people to raving vexation? Is it any wonder that the sight of them advancing en masse down a wall, or tumbling out an electric switch onto a child's hand, or blinding a fawn with stings should cause even environmentally enlightened sorts to wake up from their seething nightmares yelling, "Quick, Henry, the Flit!"?

"Hell," says one researcher, "if you told a guy that plutonium could kill fire ants, he'd want to know where to buy some." The trouble is, it would be just like the fire ant to survive that, too.

"American researchers grudgingly admire the fire ant, which has been outsmarting them for some 40 years."

She makes it look effortless.

Reflecting the thousands of hours she's practiced and honed her skills, until every muscle responds in unison to the command for perfection. It is this dedication, this courage to face competition boldly and without

compromise, that has inspired Phillips Petroleum to proudly sponsor United States Swimming since 1973.

And we'll be national sponsor for years to come. Because we believe that with every leap of grace and form, we are watching the future of our nation take shape.

PHILLIPS PETROLEUM COMPANY PHILLIPS 66

For more information on how you can help these athletes, please write to: Executive Director, United States Swimming, 1750 East Boulder Street, Colorado Springs, Colorado 80909.

By Frank Getlein

Combining the root with the reach of black aspiration

Sculptor Richard Hunt's highly acclaimed work is thoroughly modernist, but it pulses with the power of nature—and city life

In the Carter G. Woodson Regional Library, on Chicago's South Side, there is an extraordinary work of sculpture. It is called *Jacob's Ladder* and consists of three main elements, which occupy the space of a 27-foot-high atrium, with a skylight overhead (p. 62). Suspended from the rafter level beneath the skylight are two giant welded-bronze "arms" reaching down toward the floor. Each has a pair of great claws at its end. One pair holds a slight, somewhat twisted ladder. The other is empty, claws open.

On the floor beneath those reaching arms is an assemblage of bronze plates so arranged as to suggest several things relevant to the title: a primitive altar in the desert; the flame from such an altar; the future patriarch himself, rising from sleep at the heavenly visitation; even, in the upward slant of the circular base, one of those Middle Eastern ziggurats on the order of the Tower of Babel. What all of these readings of the work have in common is the attempt at a link between earth and heaven, humans and God.

But *Jacob's Ladder* also has contemporary significance. Set in a library used mostly by blacks, staffed by black librarians and located on the predominantly black South Side, *Jacob's Ladder*, the creation of a local black artist, Richard Hunt, is also an obvious metaphor for the learning that makes you free. The books, the library, literature itself, a facility with language and all the opportunities that open on the ladder of learning, all are implied strongly in this piece of sculpture in this place at this time.

Protected by a plastic visor, Hunt sends up sparks while grinding down sheets of Corten steel.

The piece he is concentrating on at the moment is an uncommissioned work he has tentatively titled *Mesa*.

Photographs by Michael Melford

Jacob's Ladder is now installed in Chicago's Carter Woodson Library in a section devoted to black history. The biblical theme speaks to one of mankind's basic aspirations, the hope of ascending to loftier levels.

In addition to which, there is a Negro spiritual called "Jacob's Ladder" ("every rung goes higher, higher") that is very much a part of the black heritage.

Yet this is not really a "message piece." The formal values are striking, as are the work's relations among its own parts and with the building.

Hunt's use of bronze as a shaped, rather than a molded, material, welded together rather than cast in one piece, combines that most ancient of materials and a modern mode of creating three-dimensional art. In *Jacob's Ladder* that combination carries an extra value: the angelic ladder of learning brings the timeless wisdom of the ages to bear on contemporary life; it opens the measureless past of humanity to humanity's latest members.

It is this kind of unobtrusive consciousness of the past working on the present that, over the past decade and a half, has made Richard Hunt the outstanding artist of public sculpture in Chicago, the Midwest and points south.

There was a time when it seemed that every European cultural institution had to have a large emblematic work by Alexander Calder, and every American cultural institution had to have the same by Henry Moore. In 1979 the National Gallery of Art in Washington opened its new East Building with one of each. That retired the cup, and the fancy has faded.

Richard Hunt now occupies the Calder-Moore position in Chicago. His large works appear in front of or inside libraries, community centers, universities, even apartment houses and office buildings. Among such patrons are the University of Illinois at Chicago; the University of Chicago; the lakefront apartment house at 900 North Lake Shore Drive, a Mies van der Rohe work; and the new, stripped-down, so to speak, corporate headquarters of Playboy Enterprises.

As of mid-1990 there are 30 or more such works around what the Chicago *Tribune* proprietarily calls "Chicagoland," and at least that many elsewhere in the Midwest and in the South. And still counting.

The secret of Hunt's institutional and individual popularity seems clear enough. He has made himself, or found himself to be, a bridge between the basic idiom of contemporary sculptural abstraction and the expectations of many people that art will say something about something other than art. Hunt's work is undeniably abstract and contemporary. Yet, it teems with suggestions, meanings, references to the immediately recognizable world.

When the subject engages him, Hunt can do art about art, although it will turn out different from work that often enough in the art world self-consciously sets out to deal with art. Consider the piece for the apartment house at 900 North Lake Shore Drive (above).

The title is *Fox Box Hybrid*. It stands on a pillar that is part of the work, the whole about ten feet high in Corten steel, naturally rusted. It could be a bird, gazing out on the inland sea of Lake Michigan, but it really isn't. It isn't a fox, either, but you can see the suggestions of the vulpine: narrow nose, bushy tail, a certain delicacy, a svelte form in motion. The box is easier, though that isn't there, literally, either. But there are boxy edges and planes all over those graceful sweeps. Hunt describes his use of different sources as a hybridizing process. "The problem of my sculpture," he says, "involves penetration of space by line, plane and volume, as well as implications of image and emotion."

Richard Hunt, the man who combines image and emotion in solid sculpture, is solid himself: about six feet tall, built like a football guard or a Michelangelo statue. The solid build is appropriate to the work, which takes heavy lifting and heavy hammering, as well as skillful manipulation of some of the most so-

Silhouetted beside Chicago's busy Lake Shore Drive, *Fox Box Hybrid* combines hints of fox tail and a box.

The author of 24 books about art and artists, Frank Getlein has written for SMITHSONIAN *on Erastus Salisbury Field and Edward Landseer.*

Master of his domain, Hunt stands proudly above the high-tech clutter of contemporary sculptor's studio.

phisticated and dangerous tools in modern light industry. He cuts, he burns, he beats the metal, and after that he treats it with acid. He often refers to his wall pieces as drawings in space.

The face above the solid figure is evenly featured and dark brown in color. The eyes are a liquid brown, the tightly curled hair grizzled gray.

He is one of the few Chicagoans completely, residentially, as a neighbor, at home in two separate areas of the city. His studio is farther up than the fashionable Near North Side in what has come to be called "the Mid-North Side." He lived in the area before he bought the studio and now lives there again with his invalid mother. But he was born in the deep-Depression year of 1935 and brought up on the South Side, then Chicago's black belt. The South Side is still largely populated by blacks, though now much of it has been turned into high-rise-housing slums.

Hunt's mother, a librarian, gave him the gift of books, then as now the Jacob's ladder up from poverty. She also gave him the gift of music. Hunt says she was a "frustrated musician" herself and therefore wanted to get her son into music one way or another. She also took him to performances by local black opera companies, which sang classical repertoire, Mozart, Rossini, Verdi and Hunt's favorite, George Frideric Handel. He studied the violin for years, thoroughly enjoyed it, and rehearsed in the South Side's Abraham Lincoln Community Center.

He had been drawing for as long as he could remember, taking art classes at the Art Institute of Chicago, and enjoying it as much as he did music. In high school he came to the conclusion that his talent for art was much stronger. Even so, the melody lingers on in many ways. In his studio, for one. The air is always discreetly filled with classical music in the background.

Politics in the family barbershop

Hunt received an early grounding in politics as well as in music and art. In the 1940s he was the factotum in the family barbershop, sweeping up the shorn hair and also serving as shoeshine boy. Those were still the years of almost total segregation. For Hunt the great thing about the barbershop was that he heard black men talking politics there: local politics, state politics, national politics and global politics. Hunt was already forming political opinions.

Hunt's studio is the dream of any contemporary sculptor working metal in large scale. It was an electrical substation generating power for light-rail surface transportation—trolley lines. The brick building, with huge windows and a full-length skylight, was built to support very large dynamos, with a crane to lift and move them as occasion required. That meant that, when Hunt acquired the building in 1971, a full-sized crane, its tracks and the load-bearing support system for them were already in place. The main floor, concrete, is 40 feet from the ceiling.

With torches and anvils, a shaping table, hammers and mallets, metal snips and cutting wheels, Hunt and two assistants work through what seems an endless stream of bronze and steel sheets that arrive flat and depart formed, shaped, buffed and burnished works of sculptural art. "Artists no longer must imitate nature," says Hunt, "but are free to interpret it. Sometimes I try to develop forms nature might create if only heat and steel were available to her."

The principal work in hand not long ago was a three-piece ensemble of welded bronze towers called

IT'S STARTING TO SOUND LIKE MERCEDES-BENZ IS ENGINEERED LIKE ONE OTHER CAR IN THE WORLD.

It's curious.

Mercedes-Benz claims to be engineered like no other car in the world. Yet recently, they've spent millions of dollars emphasizing such attributes as safety, durability, and longevity.

Qualities long associated with another car maker.

Volvo.

Which is why, if you've been thinking about buying a Mercedes, you'd do well to consider a Volvo 760. Like all Volvos, the 760 embodies all the traditional Volvo values.

It's tough, durable, and above all, it's built with your safety in mind.

But the 760 also provides a level of luxury found in few cars on the road today. From its automatic climate control to its six speaker high-output sound system, virtually every conceivable comfort is standard.

In short, the Volvo 760 is engineered to be everything a Mercedes is. And, clearly, everything a Mercedes wants to be.

VOLVO

A car you can believe in.

CALL TOLL FREE FOR YOUR CATALOG OF 1990 VOLVOS: 1-800-221-9136. © 1990 VOLVO NORTH AMERICA CORPORATION.

Eagle Columns (pp. 68, 69). It consists of three pillars fabricated of sheet bronze, one 25 feet high, the others 12 and 15, each surmounted by a welded bronze "eagle," that is, a form that suggests an eagle in flight or on the alert, watching and waiting. The work was one of the most elaborate to come from the shop. It didn't have far to go, across the street and across a one-block-square city park, where it now stands.

Hunt is very conscious that he works in a neighborhood once lived in by John Peter Altgeld, the liberal governor of Illinois in the 1890s. Altgeld pardoned three of the anarchists convicted of inciting violence during the Haymarket "riot," and he denounced President Grover Cleveland's armed federal intervention in the Pullman strike. For these actions and his general pro-labor position, he failed to win reelection. Vachel Lindsay, in a long poem about Altgeld, called him "the Eagle Forgotten." Hence Hunt's title.

The old powerhouse isn't Hunt's only workplace. Increasingly he has been a customer of the Bert Jensen & Sons metal fabricators factory in Racine, Wisconsin, a lakefront city distinguished architecturally by Frank Lloyd Wright's buildings for the Johnson Wax Company and for an earlier Wright "Prairie House" overlooking the lake.

Working in two places about an hour and a half apart, Hunt is of two minds about his two ways of work. His assistants in the former power station are recent art school graduates, currently one from Hunt's own alma mater, the Art Institute, the other from the no less distinguished Institute of Art in Cleveland. They understand readily what it is Hunt wants to do in a particular piece but, through lack of experience, they do not always understand how to get from the idea to the reality.

Technical expertise is basic to the craftsmen Hunt works with in Racine. He likes asking them to do something and having it done, and also telling them what he wants to do and having them tell him how to do it. Hunt's ideal assistant is a worker who understands sculpture as something different from one more job of metal fabrication.

"At this point in my career," Hunt says, "the path for my own expansion in large public sculpture is the

Looking like a display of surreal sculpture, this aggregation of welding masks, face protectors, hoses and wires represents only a small portion of the modern industrial equipment Hunt uses in his work.

We've catered to creatures of the night for over 1,000 years.

Cancún nights have always been filled with exciting possibilities —from ancient jaguar-gods of the darkness to modern Cancún's glittering club scene. From local lobster at midnight to margaritas under stars. So if you're a creature of the night, come prowl Cancún. Call your travel agent or write: P.O. Box 9018, East Setauket, NY 11733-3453 for a free brochure.

© 1990 The Cancún Trust

CANCÚN

The Caribbean island of legendary pleasures

further development of my own ability to synthesize more complex sculptural ideas with production techniques more easily comprehended by a broad band of professionals, artisans and workers in the metal trades."

Hunt himself was quite a remarkable art school graduate. To graduate with a "real degree," and to placate his worried parents, he enrolled for a Bachelor of Art Education degree, a ticket for teaching in Illinois public schools—just in case, as parental prudence put it, the world did not beat a path to his studio door.

In the 1950s, that meant that he also had to study non-art subjects at "real" colleges. He attended night classes at both the University of Illinois at Chicago and the University of Chicago. To help pay his tuition he worked in the zoology laboratory at Chicago and for a moment seriously considered biological science as a career. The moment passed.

At the Art Institute of Chicago he racked up scholarships as well as museum prizes: the coveted Logan Prize three times; in 1957, the year he graduated, the Palmer Prize (as in Mrs. Potter Palmer and the famous Palmer House Hotel) and the James Nelson Raymond Foreign Travel Fellowship.

That last gave him a year in England, France, Italy and Spain. British sculpture was booming in the late '50s, with a lot more to it than Henry Moore, Barbara Hepworth and the very late Jacob Epstein. It all interested Hunt, and in Spain there was Julio Gonzalez, a clear and present influence.

At the same time as these and other honors, the world did indeed begin to beat a path to his door. The first path-beater was Charles Alan, of the recently formed Alan Gallery in New York, a spin-off of Edith Halpert's now-legendary Downtown Gallery.

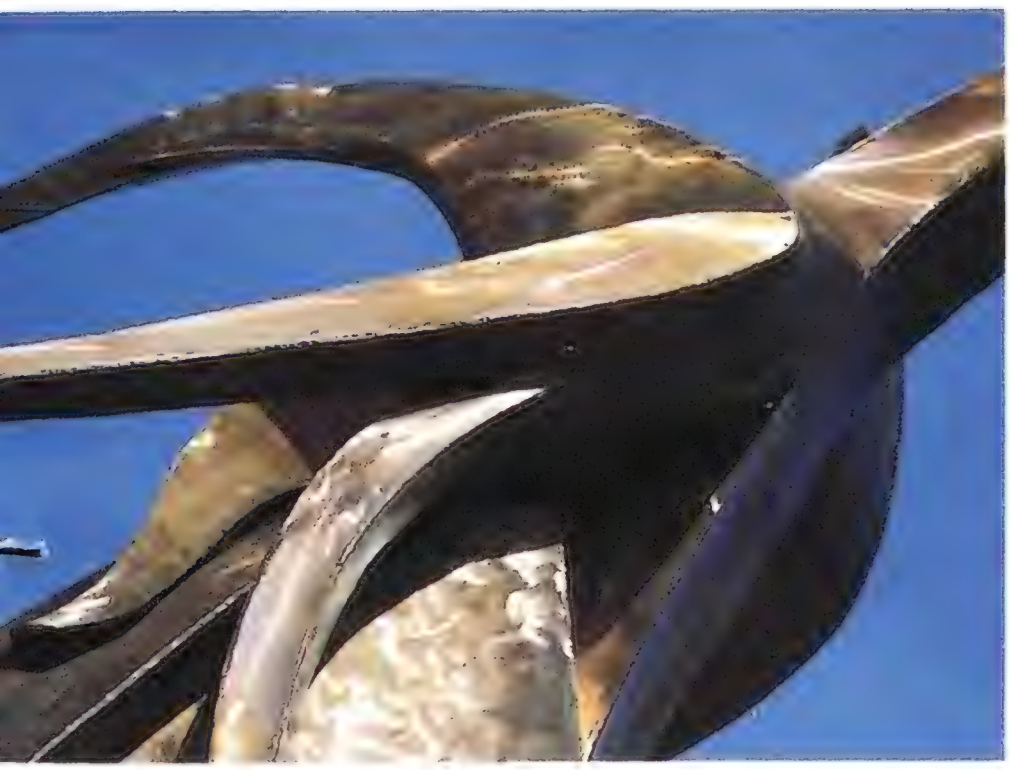
In Chicago one day, in 1955, Alan saw Hunt's work, bought a piece of his and signed him up as a gallery regular with the promise of a one-man show.

The other part of the world to beat a path to Hunt's door was selective service. Hunt found himself arriving in San Antonio's Fort Sam Houston in December of 1958, just about the time his first New York show was opening at the Alan Gallery. The Army pegged him for imminent relocation to Germany.

In an Army service club near-beer bar, Hunt struck up a conversation with a sergeant who turned out to be an Army artist about to be discharged. The sergeant took Hunt to meet his commanding officer, who was delighted to have an impending problem solved. Papers went back and forth, and Hunt became an official Army artist.

Art in that part of the Army was graphic design for recruiting posters, signs and charts. Hunt knew lettering, but he winged it for most of the time. While in the Army, he worked part time in a local art studio. Having found that Uncle Sam was amenable, Hunt eventually signed on for a course back at the Art Institute school in Chicago and got a discharge three months early. Back home, he taught for a while and then resolved to quit.

The siren song of New York drew him for a time. While he was there tentatively looking for studio space, however, Hunt was told by his friend Richard Stankiewicz, the earliest of the "junk sculptors" to command attention, that it was important to have space on the second floor or higher: that way, you got a warning when city inspectors arrived, and had time to hide your torches and other illegal equipment. There



Three-part *Eagle Columns* looms over Jonquil Park near Hunt's studio. The eagle profile (opposite) and the detail (above) show elegance of form. The welded bronze work is one of his more elaborate.

went New York. Later, Southern California proved tempting too, but finally, not for Hunt. "I'm a Midwesterner," he says. "I drive a big station wagon. I don't mind it."

But if he became, ineluctably, an artist in Chicago, he eventually decided to stop being a "Chicago" artist. Though he has often shown works "by invitation" in regional exhibitions since the early 1960s, he has rarely applied to them. Encouraged by good sales by Charles Alan, he also decided that he would live by making and selling sculpture, not by applying for and receiving grants. Characteristically, he had a Guggenheim fellowship in 1962-63, but declined to apply for the all but automatic renewal.

Hunt married a classmate shortly after graduating from the Art Institute in 1957. The marriage ended in divorce nine years later, in part, Hunt thinks, because his wife, also an artist, saw herself as a mother who was unfulfilled professionally. There was one child, Cecilia, named for the patron saint of music. Now 27, Cecilia Hunt lives in Chicago and works with fabric and jewelry, making "art to wear."

Shortly after the divorce Hunt received his first commission for a large outside piece. Soon after that the chance at the old trolley car powerhouse came along and he grabbed it.

One unexpected dividend of the building started 12 or 13 years ago. Every year since then, Hunt has brought in friends who are musicians to develop musical presentations and perform for the pleasure of other friends and neighbors. The programs range from early classical to contemporary. In 1988 the contemporary work was the world premiere of a concerto for two violins and chamber orchestra by T. J. Anderson, the longtime head of the music department at Tufts University, outside of Boston. The program included two other such concertos by Vivaldi and Bach. Musicians and audiences have been surprised to find the acoustics so good. Thomas Wikman, conductor of Chicago's Music of the Baroque Orchestra and Chorus, says that the proportions of the studio are almost exactly those of the Thomaskirche in Leipzig, where Bach spent the greater part of his career.

T. J. Anderson is involved in another extrasculptural project of Hunt's. A mutual friend is Leon Forrest, novelist and professor of African-American studies at Northwestern University in nearby Evanston, Illinois. The three have known one another for years. A couple of years ago, they began getting together for taped conversations, which they hope one day to publish as a book on the general theme of making one's way as a black artist in the overwhelmingly white world of the arts in America.

Hunt's own sharp awareness of the position of black artist as a special being began as he was returning from an art world cocktail party in the early 1960s. "I suddenly saw that artists are like Negroes—as we were then called—in many ways. People really believe the artist is better off without any money," he says, "as whites believe Negroes are happier that way. Like most artists, most Negroes do not succeed in the larger world. Inner-city blacks drop out of school at rates similar to the rates at which art school graduates drop out of art. That was a moment of illumination. I've never forgotten it."

Visiting professor, near and far

One result of that epiphany and of subsequent experiences that reinforced its meaning has been the ongoing conversations with Anderson and Forrest. Hunt's determination to shape his career could be based in part on this realization.

Although Hunt did not want to be a full-time art teacher, he has nevertheless accepted invitations to serve as artist-in-residence or as visiting professor at an impressive list of colleges and universities, coast-to-coast, Ivy to Big Ten.

In 1983, Hunt remarried. His bride was Lenora Cartright, quite as distinguished in her own world as Hunt was in his. It seemed to many an ideal marriage, and may well have been one. A black woman who started upward at the special schools of the University of Chicago, Lenora became a dean at the University of Illinois, a city official under mayors Jane Byrne and

Done in a playful mood, Hunt's *Playboy Sculpture* is nevertheless gleaming, graceful and refined.

Harold Washington, as well as a consultant on human affairs and community relations to the Roman Catholic Archdiocese and to such commercial firms as Revlon and Sara Lee. In 1989, with appalling abruptness, Lenora died of cancer of the liver.

One of the things Richard Hunt admires about Handel is the composer's ability to cope with whatever fate threw at him. When, for example, the British public tired of the elaborateness of Italian opera, Handel reinvented the oratorio and in the process created a sizable and significant part of the literature. When one of those as-yet-inexplicable and awful happenings of contemporary life took Lenora, Hunt took refuge from grief by plunging deeply into his professional practice. Simultaneously, he organized her memorial service—Handel, Bach, appropriate speakers in the Roman Catholic Holy Name Cathedral—as well as a living memorial to her, the Lenora Cartright-Hunt (United Negro College Fund) Chicago Student Emergency Fund, the institutionalized version of what he'd been saying in *Jacob's Ladder*.

In September 1989, Hunt installed *Freedmen's Column* at Howard University; it is a major work that alludes to Gen. Oliver Howard, founder of the university. Howard was the first director of the Freedmen's Bureau, established for black Americans newly freed after the Emancipation Proclamation of 1863. From Howard, in Washington, D.C., Hunt went to Harvard University to begin a full academic year as artist-in-residence. He is now preparing to do a short-term residency at Kalamazoo College in Michigan, where he will also create a commissioned work for the campus.

At some point, Hunt would like to divide his time between making large works in the Racine fabricating plant or similar facilities, and making smaller ones in the studio, works he could usually handle alone or with a single assistant. During the past ten years, the demand for large public pieces has taken him away from smaller work, and he misses it.

Hunt's place in late 20th-century American sculpture seems assured and important. At this time, thanks in part to the sponsorship of the National Endowment for the Arts, public sculpture has become a matter of giving the artist the opportunity to work on a large scale and to express whatever it is he wants to express. There are those who think this will lead to an epochal advance over the Civil War generals who still dominate streets and parks all over America and especially in the nation's capital; all were honored works in previous days. It is an advance, often, although at least two of those generals in Washington are among the country's absolute top works of sculpture: the Grant Memorial by Henry Shrady and the Phil Sheridan in midride by Gutzon Borglum.

Still, it is worth keeping in mind that from Praxiteles to Michelangelo onward the expression of the artist's own thoughts of self was managed very well within the framework of serving a public purpose. Artists working within those limits didn't do all that badly. Hunt has restored that tradition in the language of sculpture of his time. That's no small achievement.

He's done something else, too. Some of his most important works refer to or come out of the black experience in America. It could hardly be otherwise. In works such as *I Have Been to the Mountain*, a memorial to Martin Luther King jr., in Memphis, where that leader was killed, or *Freedmen's Column* at Howard University, Hunt himself acts as a bridge between the black reality in America and the essentially European, white reality embodied in the very idea of the public sculpture he is part of.

In this Hunt is also part of a new tradition that embraces Jacob Lawrence and Romare Bearden, Langston Hughes and James Baldwin, and the inspired Negro Ensemble theater.

That's good company.

Stainless-steel *Bridging and Branching*, about 8 feet high by 20 feet long, is in Schaumburg, Illinois.

"TAKE A LOOK INSIDE OUR
THAT'S WHERE THE BIG CHA

You told us you'd consider buying a GM car or truck if we changed more than just the looks. And that's exactly what we've done.

We've listened to what you said about quality. We've heard your demands for reliable, durable cars and trucks. And we've responded with new vehicles, with new technology, with new production methods in new and refurbished plants.

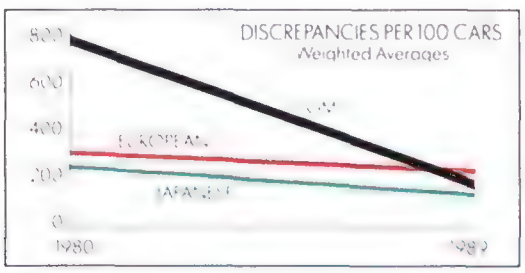
THE HEART OF GM QUALITY

We've introduced 77 new models since 1985. Almost all the cars and half the trucks we make. All re-designed and engineered to dramatically improve quality.

The looks are new. But that's not all. The big improvements are in the engines, transmissions, and electrical systems—the heart of any car or truck. And we're continuing to improve.

MEASURABLY BETTER

GM builds cars you can count on for the long term. No U.S. carmaker has done that job better in the last five years. In fact one measure of dependability, the J. D. Power dependability study of 1985 models, ranks GM highest in vehicle dependability among all American manufacturers.[1]



Since we built those cars, independent measures have confirmed that our quality has improved substantially. The differences today between GM and the best imports are very small indeed.

According to one quality study by Harbour & Associates, we're better than the average European make, and the difference between GM and the average Japanese import is less than one-half of one discrepancy per car. Our own tracking confirms GM's significant improvement.

GREATER DURABILITY

According to R. L. Polk Registrations, a higher percentage of 10-year-old GM cars are still on the road than '79s from Ford, Chrysler, Mazda, Nissan, Toyota, or Honda.

RELIABLE ENGINES

GM's engines are more dependable than those of all other domestic carmakers. The 2.3-liter Quad 4 is as problem-free as 2-liter engines from Toyota or Honda.

Our 3800 V-6 is at the top in engine quality among engines from all makers, foreign or domestic. That's the finding of the most comprehensive customer-based

survey in the auto industry. And Cadillac owners report fewer engine problems the first year than Toyota or Mercedes-Benz owners—a tribute to the 4.5-liter V-8 in Cadillacs.

BETTER-BUILT AIR CONDITIONING

The reliability of major mechanical systems is important to our customers. GM's new cars have better-built air conditioning systems than cars from Honda, Nissan, or Mazda.

PROBLEM-FREE TRANSMISSIONS

Any car or truck is only as reliable as its transmission. And our automatic transmissions are more problem-free than those of any domestic competitor—and most imports.[2]

This year GM is introducing an electronically controlled transmission that is linked with the engine's control system. An electronically integrated powertrain raises fuel efficiency, lowers emissions, and improves response.

TECHNOLOGY THAT LASTS

GM is the only domestic manufacturer to design and build multivalve engines. And we build them to last. Our 16-valve Quad 4 has already run the equivalent of 100,000 miles at 100 mph without stopping under test conditions.

On the endurance track, a full-size Chevrolet sport truck equipped with GM's

All of GM going all out for you.

NEW CARS AND TRUCKS.
NGES IN GM QUALITY ARE."

350 cu. in. V-8 captured the Hulman Trophy for sustaining 100 mph for 24 hours at Indianapolis.

MOST TROUBLE-FREE U.S. CAR LINE

A study of 1990 models done by an independent market research company ranks Buick as the top domestic nameplate, based on problems per car in the first 90 days of ownership. LeSabre was the top U.S. model, with Electra and Skylark in the top ten.

Cadillac Eldorado and the Oldsmobile 88 and Cutlass Ciera also made the list, giving GM six of the study's ten best-built American cars.

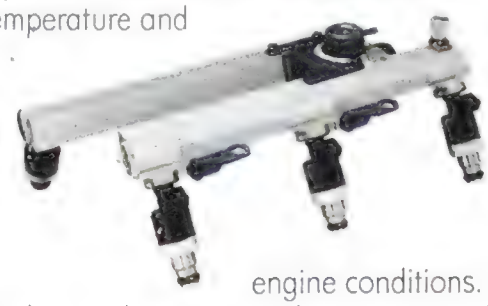
CORROSION PROTECTION

We offer the highest level of exterior-galvanized corrosion protection in the world. In fact, we're the only high-volume carmaker extensively using two-sided galvanized materials to protect against rust.

That's how we can stretch our limited warranty's corrosion coverage to six years or 100,000 miles minimum.[3]

99.9% CERTAIN STARTS

Virtually every engine in every GM car or light truck features electronic fuel injection. Electronic sensors measure temperature and



engine conditions. Re-designed injectors and engine control computers meter the right amount of fuel for sure starts.

These GM cars start the first time, hot or cold, in any weather, regardless of where you live in the United States.

HIGHLY SATISFIED CUSTOMERS

GM's Cadillac division has been the highest-ranked domestic nameplate in customer satisfaction for the past three years.[4]

The customers of every other GM division are highly satisfied as well. After six months of ownership, at least 95% of all Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac, or GMC Truck owners would recommend a vehicle from that GM division to a friend.

ENDURING VALUE

Over the last 10 years, cars built by General Motors have kept more of their original value, on the average, than cars made by any other U.S. manufacturer. Chevy and GMC trucks retain more of their original value than trucks sold in the U.S. by any other manufacturer in the world—foreign or domestic.[5]

WE COVER EVERY PART

We back our vehicles the way we build them. Our Bumper-to-Bumper Plus limited warranty covers every part of every GM car or light truck. For three years or 50,000 miles.[6]

WE CARE ABOUT YOU

We care what you think about GM quality. People throughout General Motors—the GM Quality Network—have taken a long, hard look at the cars and trucks we build. And the way we build them.

Today there is a new pride at GM. A new commitment to quality. A clear focus on our customers and on their needs. A dedication to continually improving our vehicles. Year after year. Until every model is as good as the best in the world.

We've accomplished much already. We invite you to take a good, close look at the results: our new GM cars and trucks, and the new level of General Motors quality.

1: J. D. Power and Associates Vehicle Dependability Index Study℠. In a ranking of the three domestic manufacturers, based on things gone wrong to 4-to-5-year-old 1985 model vehicles in the past 12 months.

2: GM owner-satisfaction survey for first quarter of 1990.

3: See your GM dealer for details of this limited warranty covering corrosion. A deductible applies.

4: J. D. Power and Associates 1987-1989 Car Customer Satisfaction with Product Quality and Dealer Service℠ studies. After one year of ownership.

5: GM corporate study of 3-to-5-year-old used vehicles resold between 1979 and 1990.

6: Tires on GM cars are warranted by their manufacturers. Cadillac's Gold Key Bumper-to-Bumper limited warranty offers coverage for 4 years/50,000 miles, and Cadillac's Allante is backed for 7 years/100,000 miles. See your GM dealer for details of the limited warranty. A deductible applies.

PUTTING QUALITY ON THE ROAD

GM

MARK OF EXCELLENCE

Chevrolet Pontiac Oldsmobile
Buick Cadillac GMC Truck

By Robert Hendrickson

Since 1928 it's been boom and bust with bubble gum

Parents loathe it, doctors exonerate it, kids love it—and leave it around—but pink and profitable, the stuff lives on

An eighth-grader in Beverly Hills finds anonymity behind a face-size mask created by gum and hot air.

He had it! Surely he did! The stuff was expanding like a balloon. Then wetly exploded. *THWACK!*

History hasn't honored the anonymous genius who invented the knot or nail or even such relatively modern miracles of mechanics as the screw or button. But the name of the creator of the first successful bubble gum, the "blow gum" of the South, that ubiquitous pink stuff we all blew bubbles with or stepped or sat in not long ago, would now be stuck for posterity in the annals of time.

Not that great prime makers hadn't tried before. Ever since chicle immigrated to this country in the mid-19th century—according to legend, Mexican general Santa Anna of Alamo infamy introduced it—grown men and women had been trying to devise an elastic gum that would pump up into bubbles a hundred times bigger than can be snapped with commonplace gum.

In 1918 E. Gordon Goudey, a direct descendant of Plymouth Colony governor William Bradford, one of the *Mayflower* party, manufactured O Boy Gum, which one of *his* descendants claims was the first bubble gum. There is apparently no proof, however, that O Boy resembled today's products and it definitely wasn't the first bubble gum, anyway. The first of the species appeared in 1906, when one Frank Henry Fleer, founder of the Frank H. Fleer Corporation, developed a synthetic gum with the wonderful name Blibber-Blubber, a trademark that, inexplicably, hasn't been used since. Fleer, an essential figure in gum history who would also concoct candy-coated Chiclets, worked long and hard on his pet project. It had bubbleability enough but, alas, was far too sticky and brittle. Reluctantly, Fleer had to abandon Blibber-Blubber to what might be called Bubblegumdom's Gallery of Great Globule Glitches.

Yet Fleer bubbleologists kept right on searching. Years passed, the company changed hands, taken over by Fleer's son-in-law Gilbert Mustin, and the quest continued. And now, here it was an early-August morning in 1928, and a young cost accountant named Walter Diemer did the trick. The age of bubble gum rose like a shimmering pink sun on the horizon.

Inspired by his employer's search for a large, dry bubble that wouldn't explode and stick so fast to

Gum Alley mural in San Luis Obispo resembles a Jackson Pollock, with Rolling Stones logo—the mouth.

Color photographs by Chad Slattery

young faces that parents would forbid it in the house, the 23-year-old Diemer was experimenting with a new batch of bubble gum mix. He had no knowledge of chemistry; for more than a year he'd been working by simple trial and error. He crammed a generous chunk of the mix in his mouth and blew a bubble. The bubble rose, rose higher. It was a big beautiful bubble, a Brobdingnagian bubble, a supercalifragilisticexpialidocious bubble. Diemer had never before seen one anything like it. And then it popped. Softly it popped. It popped and plopped . . . and then . . . damned if it didn't peel right off his rather prominent nose.

"I had it!" Diemer, who is now 85 and lives in a retirement village, recalls the breakthrough today, his eyes still snapping and bubbling behind his spectacles. "Everybody tried some. It really went to our heads. We were blowing bubbles and dancing all over the office!"

It was the year before the Great Stock Market Crash—but the bursting of the Diemer bubble was arguably far more momentous, or at least more momentously joyous, than the popping of the Wall Street bubble. Then, in the best tradition of Bells and Edisons everywhere, suddenly there was another obstacle to surmount. The next morning Diemer's five-pound batch of the new gum just didn't work: "Wouldn't blow a bubble worth a darn." Probably had something to do with the room temperature, he says.

Bubble, bubble, toil and trouble. Four more months of work. Sometime around Christmas that year, Diemer made an immense 300-pound batch of bubbly that didn't fizzle out in the vats overnight. "I was young, very self-conscious," he says, "and all the help was standing around looking very skeptical. They just stared disapprovingly and I was certain they were all thinking, 'That crazy kid. That stuff he made is going to break the blades in our mixing machines.' Well, the machines started groaning, and the mix started popping and then . . . I realized I'd forgotten to put any coloring in the gum."

Diemer remedied his mistake the very next day, when he made a second superbatch. "Pink food coloring was the only one I had at hand," he says. "And that's the reason ever since, all over the world, that bubble gum has been predominantly pink."

The Dom Pérignon of bubble gum has always steadfastly refused to reveal his original formula, except to say that he used "the standard ingredients" already employed in those days. It was rather a unique combination of the same materials. Bubble gum is different from its older sibling mainly in the elasticity and firmness of its base, which produces a film strong enough to hold more air while stretching thinner and thinner, to create bigger, better bubbles.

It becomes soft at mouth temperature

A harmless rubberlike tree latex—similar to the one used in those days for making girdles—was what gave the first bubble gum its elasticity, though today synthetics like vinyl resins and microcrystalline waxes are used. The new synthetics can best be described as "thermoplastics," Diemer says, because "they become soft at mouth temperature," and they "definitely aren't like rubber tires." In any event, the prime maker didn't even patent his invention. Gum manufacturers are a competitive and litigious lot, and he feared that since "patents can be a license to steal" he might be "exposing trade secrets to others."

The day after Christmas 1928 the first Dubble Bubble, as Diemer's boss dubbed his invention, was test-marketed in Philadelphia, in a mom-and-pop candy store at 26 Schenectady Street. The location remains unmarked by any commemorative plaque or pink

Buried in bubble gum, Michelle Heymann achieves a condition that most 13-year-olds only dream about.

A dealer in baseball cards, Carol Armstrong holds up Mickey Mantles now worth about $2,100.

Like the gum itself, Bazooka comics have spread all over the world, in 55 countries and many languages.

globe, but Dubble Bubble was an instant success, so much so that within three months imitations were on the market. Dubble Bubble, however, far outstripped all upstart competitors. It also quickly surpassed Tootsie Rolls to become the world's biggest-selling 1-cent confection and an American institution, as well as a synonym for bubble gum itself.

Bubble gum sales in the United States alone last year reached an estimated $150 million. But Diemer isn't bitter about not receiving royalties on a patent that would have made him a billionaire. "After all," he says, "I was a Fleer employee." His discovery did move him up the corporate ladder to senior vice president, and he remained a member of Fleer's board of directors for 15 years after his retirement to Ocean City, New Jersey, in 1970. A few years ago, after a series of crippling strokes, he learned to walk again at a local rehabilitation center. In a spirit appropriate to the cheerful inventor of bubble gum, he says, "Why, the 75-year-olds there had more problems than me—seven years older!—so I'm grateful."

Diemer has no qualms about bubble gum. He hardly gives a thought to the legions of outraged parents, teachers, dentists, philosophers, fundamentalist preachers and, of course, janitors who for years have condemned him without even knowing his name. He much prefers to take pride in the scores of congratulatory letters and calls he has received from all over the world. "I have no regrets," he says. "Bubble gum brought a little happiness to millions of kids, and if I could do that I'm happy."

This article is adapted from The Great American Chewing Gum Book *by the author. He is working on a collection of short stories entitled* After the Wars.

Soon more than 20 other companies were competing for a share of an apparently inexhaustible—and ultimately international—market that eventually included many adult "connoisseurs" who say they find bubble gum a better chew than regular brands. For years Dubble Bubble's chief competitor was the Bowman Company, purchased in 1955 by the Topps Company, which first made ordinary By Gum gum but soon came up with their famous Blony, guaranteed to produce bubbles "twice as large as any other" and advertised as "the biggest piece of gum available for a penny."

Bowman was among the first companies to insert picture cards in their bubble gum packages. At the outset these cards depicted the traditional cowboys and Indians—until J. Warren Bowman, the company founder, included pictures of war heroes. Today a full set of his 240-card war series is a collector's item, worth well over $1,000. But at the time, the cards created an international incident: some of them centered on the Japanese invasion of China in the 1930s, and after 100 million had been issued, the Japanese Embassy in Washington protested that "peace-loving Japan" was being done an injustice. The State Department coldly replied that there was nothing unjust about depicting incidents like the Japanese sinking of a United States gunboat, the *Panay*, in the Yangtze (now Chang Jiang) River in 1937.

The resulting furor only gave Bowman welcome publicity. Bowman was the first man to build bubble gum plants in Japan. Parents and teachers reasoned that the Japanese had more than one motive for going after him—he might even have given them a motive for Pearl Harbor. Japanese youngsters were soon driving their elders to near seppuku as a result. In 1937 Bowman was denounced as an "enemy of Japan" and

The power of positive blowing, on the field of combat, is illustrated by a University of Maryland punter.

John McGrail

The Thomas Edison of bubble gum, Walter Diemer, 85, savors flavors in retirement with a grateful visitor.

banned from the empire. Most Japanese obviously agreed with the anonymous old American rhyme:

> The gum-chewing kid
> And the cud-chewing cow
> Are somewhat alike,
> Yet different somehow.
> And what is the difference?
> I think I know now—
> It's the clear thoughtful look
> On the face of the cow.

Even before the war American children were spending close to $4.5 million a year on Walter Diemer's invention. During World War II the bubble burst when a shortage of essential Siamese jelutong forced bubble gum makers to halt domestic production. G.I.'s, however, blew bubbles all over the globe—in Europe, Africa, Asia, Borneo, even on Pitcairn Island, where descendants of mutineers on the *Bounty* (SMITHSONIAN, February 1988) took eagerly to bubbling. Servicemen introduced Dubble Bubble to the Eskimos and it was reported that they preferred it to their previous favorite chew—whale blubber.

There were the usual promotional stories, the truth hard to separate from P.R. In Africa, it was said, various tribes accepted large quantities of bubble gum in lieu of sheep and oxen as payment for a wife. Headhunters in Borneo kidnapped a diplomat and held him for a ransom of Dubble Bubble. On the home front the Brooklyn-based Topps Company entered the gum field in 1938, and later became famous by offering bubble gum baseball cards and by introducing Bazooka brand bubble-gum-blowing contests among ballplayers. "Don't talk, chum; chew Topps gum" was their version of the wartime admonition "Loose lips sink ships."

Robert Benchley approved of gum chewing in an essay called "America's Greatest Movement—The Jaw Movement." But "bubble gum" was soon a slur among intellectuals. Phrases like "the bubble gum of literature" popped up. Ezra Pound referred to a noted literary award as "the bubble gum prize." Writers tended to side with Elbert Hubbard, who had written: "We will never be a great country until we expend more money for books than we do for gum."

The postwar years brought a bubble gum boom

He is unabashed by the outrage of parents and teachers, because gum brought "happiness to millions of kids."

Peter Brandt

Fresno's Susan Williams, who blew the world's biggest bubble, a 22-incher, is also a double bubble virtuoso.

never equaled by any plaything anywhere. To kids, one gum maker claimed, the return of bubble gum was second in importance only to the return of their fathers and brothers. Almost as soon as they could buy "pink gold" again, students in Longview, Texas, conducted a contest and crowned local chewers for bubbles that had the loudest pop, were the messiest, biggest, smallest, "cutest," "most geometric" and "most glamorous." Bubble gum manufacturers at first could not meet the demand. A "pink market" emerged, mainly operated by kids (so far as is known the Mafia didn't get into this act). Manufacturers supplied at regular prices what penny gum they had coined, and young retailers sold it at whatever the traffic would bear. "I remember four people best from World War II," Robert McShane, now himself a high-powered office equipment salesman, recalls. "Hitler, Mussolini, Tojo and Cynthia Bolo. When I lived out in Far Rockaway, Cynthia used to sell me bubble gum at *one dollar* a piece."

There were times when penny pieces of Dubble Bubble did indeed go for one dollar each. Those lucky enough to get it kept it "alive" at night in a glass of water and chewed it for as long as a month.

Parents of bubble gum addicts firmly believed its popularity with children was based largely on its capacity for driving parents crazy. To a person, they loathed the pernicious stuff, whether chewed or sat on, and dreaded washing it off clothing, peeling it off faces and cutting it out of hair. "This bubble," one father held in a letter to a newspaper, "may grow larger than—and just as empty as—Junior's little head, before it bursts with a loud, ghastly, vulgar, thwacking sound."

From that day to this, adult protest has done little to hold back the bubble gum tide. Nothing so reactionary as a parent or teacher was going to stop it. Today bubble gum (now inflated to 3 cents for the Dubble Bubble or Bazooka penny piece) is still smuggled into houses and schoolrooms. Bubbles the size of gallbladders are blown to tatters whenever the teacher's back is turned. If there's danger of confiscation, a mouthful can be molded around a pencil eraser or filed for future use on the underside of a desk.

Many have tried, yet no one has been able to make a hard case against bubble gum as harmful to youngsters on other than esthetic grounds. In June 1947, grownups thought their time had come, when a puzzling

epidemic of sore throats, vomiting and headaches spread among youngsters throughout America. Parents quickly blamed it all on villainous bubble gum. The U.S. Food & Drug Administration collected 4,000 samples and subjected them to scientific tests unlike any ever performed before. Seventy-five human guinea pigs, including 25 children, chomped and blew bubbles for periods of up to eight hours, the test wads composed of anywhere from one to six pieces. In the laboratory, investigators analyzed the gum ingredients, implanted gum in the skins of guinea pigs, attached wads of chewed gum to shaved rabbits, fed the stuff to monkeys, cats, dogs and even chickens. No toxic ingredients were found, and the FDA dismissed the complaints. Except for aching jaws, there were no bad reactions to the tests.

Of course, bubble gum has claimed some victims and fostered some gruesome stories. Kids certainly chew too much bubble gum at a time—and have been known to dislocate their jaws this way. In 1944, a piece of it exploded in a Philadelphia man's mouth causing him to lose several teeth; no one could establish just how. One of the more horrendous bubble gum rumors tells of a grandmother who choked on a huge wad after watching her grandson hit a Little League home run. Still, these accounts are mild compared with The Great Gum Murder case. On that occasion, some fiend tried to kill a Sacramento family of four by slipping them all poisoned gum. (What zany mystery novelist would dare use the scheme as a plot!)

The pink stuff has ruined far more rugs and seats of pants than it has lives, though entire cities have campaigned against it. In 1983 Singapore proposed a ban on bubble gum in all housing projects, claiming that it cost the city $7,500 a year to clean up discarded wads. On the other hand, dentists and speech therapists sometimes recommend chewing bubble gum to strengthen weak jaws. A Columbia University test once found that the chewing of any gum reduces muscular tension and makes people feel more relaxed. Years ago, too, it was reported that a restaurant at the House of Representatives kept a hidden supply of bubble gum for at least three nervous Congressmen who were surreptitious gum chewers. Then there was the authority on organically grown foods who claimed that liquefied bubble gum makes a useful insecticide, far safer than DDT. Bugs nibble on it, she insisted, and their jaws stick together so they can nibble no more.

Dentists and dental researchers deny Diemer's claim that bubble gum helps teeth. But even they will admit that the stuff is not, as used to be claimed, made from horses' hooves, old girdles and inner tubes—or used gum scraped off the street. Furthermore, it will not cause buck teeth, snap and pop in the stomach, give you appendicitis, clog up the intestines, stunt your growth or seal the lips so that youngsters can't breathe, as hysterical parents have claimed over the years. All you can do with ordinary gum is chew it, snap it, stretch it, sculpture it, fish coins out from below gratings with it, and leave it under tables or on the arms of theater seats. Bubble gum opens vast new vistas for the younger set. It means a lot to them. Once I found my children fighting with the dog for a wad. (Writers can't even keep the whole family in bubble gum.)

Great moment in gum history: Miss Orange County assesses the work of Angels pitcher Mickey Scott.

A bubble in a bubble in a bubble

You've probably seen photographs of animals, especially horses, blowing huge bubbles, but these are always pink balloons supplied by P.R. people. As to bipedal bubble blowers, many contests have been held around the world. I've been told that several years back one megabubble dwarfed the blower's upper body, but that is hearsay. It is also said that someone at the Philadelphia Chewing Gum Company once blew a jumbo triple bubble (a bubble in a bubble in a bubble). To date, the official record is held by Susan Montgomery Williams of Fresno, who in 1985 blew one 22 inches in diameter as measured by a "gumputer."

Among the hundreds of bubble gum flavors today

If you're hooked on the history of flight...

Accept Membership in The National Air & Space Museum

Your first benefit is the next issue of

AIR&SPACE
Smithsonian

SPECIAL ANNIVERSARY EDITION 20 Years Since Apollo 11
AIR&SPACE
AIR&SPACE
Vigilant Viggens: swift, Swedish, and unswervingly neutral

Man's greatest adventure began when Orville Wright lifted off the ground for 12 seconds. Sixty-six years later, Neil Armstrong landed on the moon. But it wasn't until 1986 that a magazine devoted to flight was born.

NOW you can share the adventure in AIR & SPACE/ *Smithsonian*.

SOAR with Voyager circumnavigating the globe nonstop.

SEE the giant Hindenburg materialize from the clouds and sail silently past you on her voyage to destruction at Lakehurst.

ORBIT Earth with Astronaut Sally K. Ride watching "smoke rise from fires that dotted the east coast of Africa, and moments later, ice floes jostling for position in the Antarctic."

Walk the bucking deck of an aircraft carrier at sea. Study pilots' UFO reports. Peddle across the English Channel in a human powered blimp.

SPECIAL CONSIDERATION
If you are already a Smithsonian National Associate, Contributing Member, Resident Associate or a Cooper-Hewitt Associate, you pay only $16.00 for a full year's subscription to AIR & SPACE/*Smithsonian*. In addition to the benefits you already enjoy as an Associate, you'll receive discounts to performances at the IMAX Theatre and the Planetarium.

To accept this offer and the savings that go with it, mail the coupon today.

MEMBERSHIP APPLICATION

Please enroll me as a Member of the National Air & Space Museum and send me the next issue of AIR & SPACE/*Smithsonian*. If I choose to continue, I will pay only $16 annually, and get five more bi-monthly issues for a total of six AIR & SPACE/*Smithsonian* plus all other benefits.

☐ Payment Enclosed.
(Make check payable to Air & Space/*Smithsonian*.)

☐ Bill me $16 because I'm already a Smithsonian National Resident, Cooper-Hewitt Associate, or Contributing Member.

My name (please print) _____

Street _____ *Apt* _____

City _____ *State* _____ *Zip* _____

Gift recipient's name _____

Street _____ *Apt* _____

City _____ *State* _____ *Zip* _____

This membership is: ☐ For myself ☐ A gift ☐ Myself plus gift

Outside U.S., dues are $24 payable in advance in U.S. funds. 85% dues designated for magazine subscription. Allow 4-6 weeks for delivery of first issue.

MAIL TO: AIR & SPACE/Smithsonian, 420 Lexington Avenue, Suite 1945, New York, NY 10170 5SB42

are foreign favorites like Ginseng Love Bubble Gum (Korea), Brooklyn Bridge Gum (Italy), Pingi Pongi (Brazil) and Hollywood Gum (France). Domestic brands include Hubba Bubba ("the only bubble gum that won't stick to your clothes"), Bubble Fudge, Bubble Burger, Tubble Gum (comes in a toothpaste tube), Popeye Shredded Bubble Gum ("looks like spinach . . . tastes like bubble gum"), a green paste called Ghost Busters Slimer Bubble Gum and even Bubble Tape, a full six feet of gum that comes in a tape-measure-like dispenser. The Wm. Wrigley Company, with nearly 50 percent of the total domestic chewing gum market, puts out Big League Chew, a pouch filled with bubble gum meant to resemble chewing tobacco. A legion of little kids has been recruited by Amurol, a Wrigley division, to make daily tests of new products. Far behind Wrigley, but an industry leader, is the Lifesavers Company, whose "soft and juicy" Bubble Yum managed in 1977 to survive—with the help of 30 full-page newspaper ads—a lurid rumor that their gum contained spider eggs.

Recently one of President Bush's grandsons advised him that he wanted to be a ballplayer, not a politician—because "politicians don't get their pictures on bubble gum baseball cards." The enterprising Topps Company in Brooklyn, still the world's leading baseball card gum company, quickly set things right. Obtaining a photograph of George Bush as captain of the 1948 Yale team that played in the College World Series, Topps ran off 100 baseball cards featuring Mr. Bush and presented them to the President. One day these may be as valuable as the Topps 1952 Mickey Mantle card, worth $8,000 today. The original oil painting used to make Mantle's card sold in 1989 for $121,000.

Topps, a virtuoso at P.R., boasts of making the world's largest piece of bubble gum, a hunk of its Bazooka brand about the size of 10,000 normal pieces. In 1974 it was presented to baseball (and bubble gum) great Willie Mays. There wasn't space for it in his trophy room, so he asked that it be divvied up into individual pieces and given to youngsters in hospitals.

The economic prosperity that has lined children's pockets has made bubble gum a major industry. In a country that still spends more on gum than on elementary school textbooks, bubble gum tycoons are blowing bubbles all the way to the bank. Fleer alone makes more than four million pieces of Dubble Bubble a *day*, gum that is exported to some 50 countries, including several behind the no-longer-Iron Curtain. Diemer's invention now chews out into colors ranging from red, white and blue to orange, yellow and ecru—though pink is still America's favorite. Many brands come with comics and fortunes, printed in a dozen languages. Cards still feature football and baseball players, other sports heroes, Presidents and movie stars. Of course dieters chomp only sugarless bubble gum—sweetened with sorbitol or similar chemicals.

Even once-stodgy Japan has changed its mind about bubble gum, and gum in general, which they call *gamu*. The Japanese, who now manufacture at least 150 gum flavors, including pickled plum, probably best established the greatness of gamu in 1962, when the Let's Chew More Gum Association opened offices in Tokyo. The gala opening, attended by show people, politicians, baseball stars and sumo wrestlers, amounted to a kind of religious ceremony during which a special prayer to gamu was intoned by a Shinto priest standing before an elaborate altar:

> O Great Spirit of the Chewing Gum, gum of diverse kinds, we offer this prayer to thee. There is grandeur in chewing gum. It is our marvelous pet, an important accessory of mankind in this modern age. Chewing gum sweetens the breath, imparts a pleasant feeling, strengthens the stomach and calms anger. . . . It invites happiness. It attracts smiles. An enjoyable and intellectual life is made possible because of gum chewing. . . . O Great Spirit of the Chewing Gum, rest in peace. . . .

Roughly speaking, the bubble gum that Americans have chomped on over the years would make a stick nearly 113 million miles long, without even stretching it or blowing a bubble; long enough, that is, to reach more than 200 times to the moon and back. Another figure some mad mathematician concocted years ago holds that the energy Americans expend every day when chewing bubble gum would light a city of ten million people.

And so we chew on, borne ceaselessly into the future, chomping and thwacking, thwacking and chomping, billions of us here on Earth and in outer

space. The astronauts busily snapped bubbles (from sugar-free gum) while in orbit. Mickey Mantle blithely blew a bubble while awaiting a fly ball in the outfield. Jeremy Boob, PhD, fixed the propeller on the Beatles' Yellow Submarine with bubble gum, helping the lads escape His Meaniness and the Meanies. Anyway, people can now be incontrovertibly classified as a bubble-gum-chewing species—*Homo chompit sapiens*, Linnaeus might have said.

So there really ought to be a monument to Walter Diemer in Philadelphia, somewhere near the busts of the Founding Fathers—or at least next to that controversial statue of Rocky—a bust of the inventor of bubble gum, chewing, chomping, blowing and bursting that first momentous pink bubble.

Chewing Bubble Tape and blowing easy, Jenny Brandt matches Joshua Amsellem, bubble for bubble.

Jenny, who according to her mother often gets gum in clothes and hair, grins unrepentently with Josh.

Open any door and you'll...

The 1991 Chevrolet Caprice.

You're about to enter a new, larger world of luxury. Prepare to be impressed. This new Caprice is not only **longer than last year and roomier than ever before, it's the most spacious Caprice of all time.** With more room for both your passengers and luggage than nearly every luxury sedan sold in America. At any price.

Length	214.1″
Width	77.0″
Wheelbase	115.9″
Head Room, Front/Rear	39.3/38.1″
Leg Room, Front/Rear	42.2/39.0″
Shoulder Room, Front/Rear	63.4/63.4″
Hip Room, Front/Rear	57.0/56.9″
Trunk Space	20.4 cu. ft.

Chevrolet, the Chevrolet emblem and Caprice are registered trademarks of the GM Corp. ©1990 GM Corp.
® All Rights Reserved.
Let's get it together...buckle up.

see more space than ever.

This is the next generation of America's best-selling full-size sedan. The new 1991 Chevrolet Caprice.

Open the driver's door and see what you've been missing. A luxurious environment that **comfortably seats six.** And can include the classic richness of leather in the seating areas. An option worth the indulgence.

Open the trunk and see how much more you can carry. The **20.4-cu.-ft. trunk holds four golf bags** and enough golf balls to play almost forever.

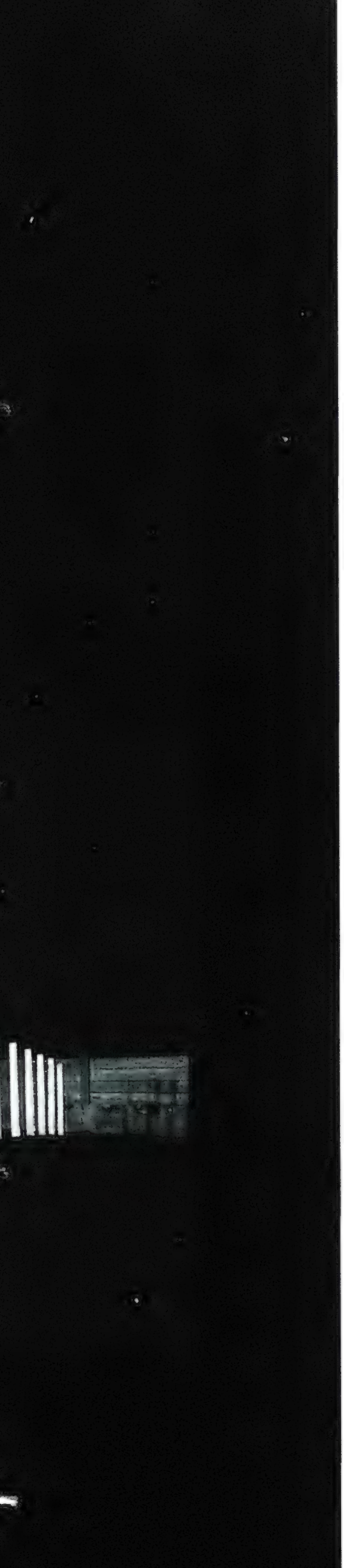
You expect a car this spacious to come with a long list of features. And it does. Caprice has **more standard features than many higher priced cars.** Standards like anti-lock brakes, which many only offer as options. Or standard Scotchgard™ Fabric Protector, which they don't offer at all.

Now that you see how much Caprice has to offer, we invite you to drive it. And discover the biggest pleasure of all.

For more information regarding the 1991 Caprice, please call **1-800-879-1991** or see your Chevrolet dealer.

THE Heartbeat OF AMERICA IS WINNING.
TODAY'S CHEVROLET

Michael Kenna, *Tilted Poles*



"The field cannot well be seen from within the field."

Ralph Waldo Emerson

To know what is possible tomorrow you must be willing to step outside of what is possible today.

The long view is all.

At Toshiba, we've been taking that view to help create a tangible future for over one hundred years.

Sustaining it now with our commitment to manufacturing in the U.S. And with a wide diversity of products of the highest quality.

All of which have helped make us one of the leading electrical and electronic manufacturers in the world.

A nice perspective to have. When you work in as many fields as we do.

In Touch with Tomorrow

TOSHIBA

Color TVs & VCRs

Computers & Printers

Copiers

CT Scanners

Digital Instrumentation

Disk Drives

Facsimile Systems

Home Appliances

Industrial Motors & Controls

Liquid Crystal Displays

Medical Tubes

MR Imaging

Nuclear Medicine

OPTO Electronic Devices

Picture Tubes

Portable Audio

Professional Video Systems

Room Air Conditioners

Semiconductors

Telecommunication Systems

Turbines & Generators

Ultrasound

Uninterruptible Power Supply

Variable Speed Drives

X-Ray Systems

By Joseph S. Levine

For fish in schools togetherness is the only way to go

Traveling in groups makes it easier for them to find food and avoid the jaws of death, but how they go about it is still a mystery

Twilight descends on the coral reef. Hordes of glassy sweepers edge skittishly toward the mouths of caves that have sheltered them during daylight. As underwater shadows deepen and disappear, a few score venture forth, silvery bodies flashing in the fading light. As their numbers swell into the thousands, they move back and forth along the face of the reef, surrounded by predators. More and more restless the milling throng becomes, until darkness is nearly complete. Then, running the gauntlet of gaping jaws around them, they burst out into open water to scatter and feed under cover of darkness.

For many fish species, survival means fellowship with others of their kind—whether in tightly organized schools or looser aggregations. The way they stick together and the varied behaviors they exhibit have delighted, perplexed and amused observers for centuries (SMITHSONIAN, January 1974). Some species gather in groups of no more than half a dozen, and may be sociable for only a few days or weeks a year. Others spend almost their entire lives swimming in formation with thousands of their fellows, packed together so tightly that they nearly rub fins as they swim.

To coordinate their activities, fishes communicate in many and sometimes most unusual ways. Some rely on sight and distinctive body-color patterns. Most have special sense organs on their skins that can "hear" the movement of their cohorts through the water around them. Others talk to one another in private languages of clicks, grunts and growls. And still others communi-

By sheer numbers, a school of surgeonfish can move other fishes away from a choice feeding spot on a reef.

They are named for the sharp caudal spines that
let them slash competitors with a sweep of their tails.

Photographs by Jeffrey L. Rotman

Not all groups of fish are schools; these striped sergeant majors are considered to be an aggregation.

cate with electric pulses that they generate in highly specialized muscles.

Different kinds of fish schools can be both similar to and different from other kinds of animal groups. We've learned over the past 20 years or so, for example, that many animal societies are collections of close relatives; the 22 million members of the African driver ant colonies are all sisters (though they may have different fathers), and members of many mammal groups—such as lion prides and certain monkey troops—are at least as closely related as cousins. Not surprisingly, many intricate, fascinating and often savage things that these animals do—ranging from aggression and infanticide to food sharing and caring for the young of others—are based on the individuals' ability to keep track of who is related to whom.

Among fishes, though, familial relationships are looser. Many schooling species engage in group sex during spawning—a wild affair during which mad dashes and gyrations by ensembles of males and females lead to the release of countless invisible sperm and nearly invisible eggs. Unlike birds (and some solitary or pair-forming fish species), who feed or shelter their young, and mammals, who suckle them, schooling fishes abandon eggs and larvae to float away on the currents. This drifting makes it unlikely that the fish in large schools are closely related to one another, and the lack of interaction between parents and offspring makes it equally unlikely that they themselves can tell whether they are related or not.

Yet fish schools can have the same sorts of "personalities" as more familiar animal groups. Some, like large flocks of many birds, appear to be egalitarian. Large schools of open-water fishes and the small clusters of minnows you're apt to see in shallow water may not have predetermined "leaders." Instead, decisions are somehow made by one or more individuals within the school signaling by behavior changes that they have detected food, predators or better water conditions. The message spreads from those individuals like a wave across the group, gradually affecting everyone in the crowd.

The pecking order and sexual politics

Other schools, particularly in species that stake out a territory to live in, have definite hierarchies. Certain individuals (usually one or more large males) live at the top of the pecking order; other members fall into rank order beneath them.

In some species, this tightly organized social structure can include remarkable examples of sexual politics. Schools of brightly colored scalefin anthias, for instance, consist of orange-red females and violet-purple males. Curiously, all the eggs of this species

Mustard rays gather at the surface of a protected bay in the Galápagos, a rarely witnessed phenomenon. They may be coming together to spawn or begin a migration, but biologists admit they just don't know.

hatch into females. As they mature, they join a predominantly female school at the bottom of a pecking order in which larger females dominate smaller ones. Above the largest dominant females, a small number of males hold sway.

As long as school population remains stable, so do the sex roles of members. But if a male disappears, the largest female changes sex; within two weeks, its body colors, its behaviors and its gonads have transformed into those of a fully functional male. Just how these changes are triggered and controlled remains a mystery.

As intriguing as group sex and transsexuality may be, however, they must have evolved after some fish species began to live in schools. There are real advantages to schooling that concern two of the most important parts of life in nature: finding a meal and avoiding being made into someone else's dinner.

In large schools, as in many bird flocks, only a few members need to find food to alert the entire crew.

Harvard-trained marine biologist and author of both text and trade books on the subject, Joseph Levine now concentrates on science films and videos.

Goatfish schools use hundreds of pairs of eyes and an equal number of taste buds on flexible barbels to find food far more efficiently than a single fish could. As a school explores a stretch of sandy bottom, any fish that finds a meal stops and begins to dig, stirring up the sand. In no time, the area around it is packed with eager schoolmates, digging and probing for all they're worth. Eventually, other species of fish, attracted by the ruckus, will home in on the feast.

Other schools use the power of numbers to outmaneuver competitors. Surgeonfish, for example, are gentle, even shy creatures that make a living by scraping algae off rocks and coral rubble. But many of the best algal gardens on the reef are guarded by one or another species of scrappy little damselfish. Delicate names notwithstanding, "damsels" act like pint-size Rambos, bullying, attacking and chasing off fishes many times their size. A single surgeonfish attempting to feed on damsel-guarded turf is invariably driven away. But when a school of 50 descends on a damsel's territory, there is little that even the toughest defender can do.

Numbers also offer safety to fish in schools, as they do to antelope and wildebeest of the African plains.

Solitary predators have a tough time feeding on tightly schooling prey, in large part because of the visual confusion created by the throng. Faced with a predator, schools perform graceful and effective maneuvers. Twisting, wheeling and flowing like the water they swim in, schools may actually surround a bewildered predator—leaving a respectable vacuum around the hungry mouth, of course—and flow around it to rejoin out of sight at the rear. As a result, most solitary predators, though they follow schools closely, rarely try to attack the group during the day.

But few (if any) defenses in nature are absolute. Groupers are constantly vigilant and quickly pick off any unfortunates that stray from the edge of the school. Other predators turn the habits of their schooling prey against them. A swordfish, for example, will race into the heart of a school and slash around randomly with its bill, killing some and maiming others. As the rest of the school flees, the dead and dying are left behind for leisurely dining.

Like underwater wolves, jacks stalk schools

Schooling is also a less-than-perfect defense against schooling predators. Jacks and bluefish stalk schools in much the same way that wolves and wild dogs stalk herds. Usually jacks try to split their victims into smaller groups and force them up against the surface of the water or into the shallows. Once the siege is set, individual predators take turns making brief, wild dashes into the center. They rarely succeed on these dashes, but the effect is to scare a few individuals out of the school, making them easy targets. Because the predators take turns, all get to eat. You can see this carnage in progress in many parts of the world; up and down the Atlantic coast, for example, bluefish slaughter menhaden in the otherwise placid waters of coastal bays and estuaries.

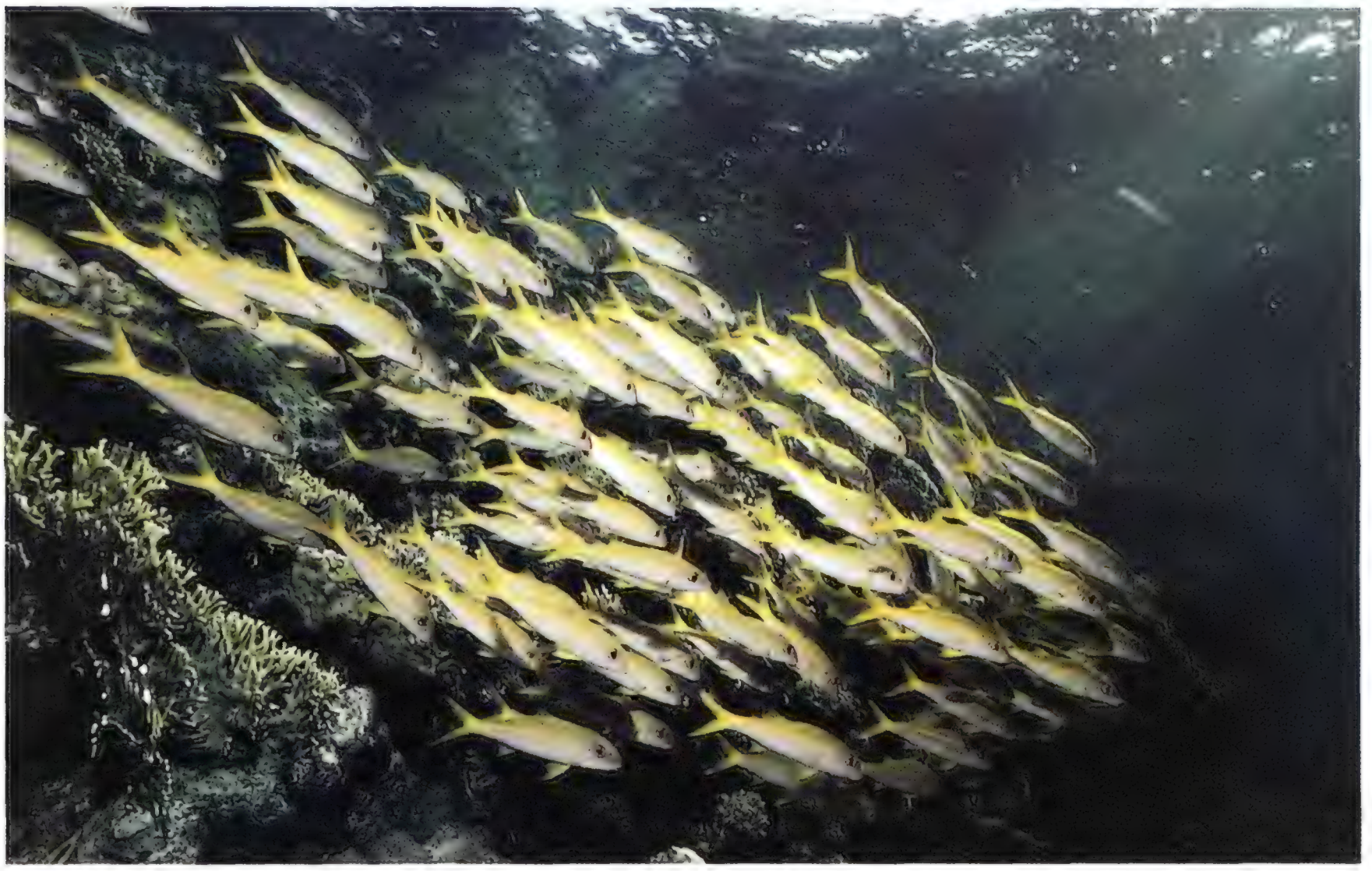
Finally, schooling works well as a defense only in the bright light of day. Most fish that school have trouble seeing during dawn and dusk twilight periods, and may become disoriented. Waiting predators (whose eyes are better suited to dim light) can pick off disoriented school members fairly easily. At night, scattering rather than schooling is the best defense.

Thus the daily cycles of light and dark combine with the advantages and disadvantages of group life to put schools through their paces with clockwork accuracy. Each morning at dawn, wandering glassy sweepers return unerringly (we know not how) to the same caves their school vacated the evening before. Schools of scalefin anthias, of goatfish, of scores of gaudily painted species—once again secure in their view of the reef around them—rise above the coral towers to feed, to breed and to fill the waters with color and motion.

Sweepers hiding by day in a cave maintain school formation as they keep a safe distance from a diver. When night falls they will leave their lair and disperse to feed on the reef as individual foragers.

Jacks, schooling predators searching for schooling prey, keep the same respectful distance from a diver.

A school of goatfish sweeps over a finger of reef separating sandy bottom areas on which they feed.



NORTH COAST
RESERVE CELLARS
1987
VINTAGE

THE RESERVE CELLARS OF

Ernest & Julio Gallo

North Coast

CHARDONNAY

OF CALIFORNIA

EST & JULIO GALLO, MODESTO, CALIFORNIA

It will change the way you think about Gallo.

© E.& J. Gallo Winery, Modesto, CA.

By Michael Parfit

A Brazilian master who finds the art in nature's bounty

Landscape architect Roberto Burle Marx has long been a creator of designs that raise human awareness of plants, stone and water

Surrounded by the native Brazilian plants that he loves, the octogenarian discourses on his craft.

Clemente Gomes and Roberto Burle Marx strolled through the exuberant garden they had created with Gomes' money and Burle Marx's genius, giving a solemn imitation of two white-haired old men on pensions. The garden belied their act. More than a dozen species of agave exploded in sharpened spikes on stone tiers to their right, and a column made of stacked millstones towered to their left. Dozens of palms soared, a *Bombax malabaricum* tree lifted magnificently skeletal arms to hold tufts of scarlet flowers, and water poured in shining, sibilant sheets from rectangular pools with lily pads the size of card tables. The two men walked slowly together, Burle Marx stout and Gomes wiry, and Gomes held the arm of his old friend, who is one of the world's preeminent landscape architects, as delicately as if it were a precious vase.

Then the "vase" leapt out of his grip, and Burle Marx, abruptly looking like Albert Einstein with his finger in a live socket, burst forth. "In the same way the indoors is linked to the garden," he said, drawing the last word out, "the garden must be linked to nature!"

Pensioners no more, Gomes and Burle Marx stood by the unfinished garden, Burle Marx waving his arms, talking slowly in English, talking rapidly in Portuguese and singing in Italian. "You must know the language of nature!" Burle Marx proclaimed. "If you do not know the language you cannot create a poem." Gomes slyly murmured "Hello," "Thank you" and "How are you?" in Russian. All around them the garden bloomed extravagantly. "You see," Burle Marx said in English, turning to me, "I am at home here."

I recently followed Roberto Burle Marx from home to home—from garden to garden—for two weeks. I had come to see him because Burle Marx is a legend, a part of history who is still making it: an extraordinary landscape architect who, from the beachfronts of Copacabana and Miami to the forests of the Amazon, has

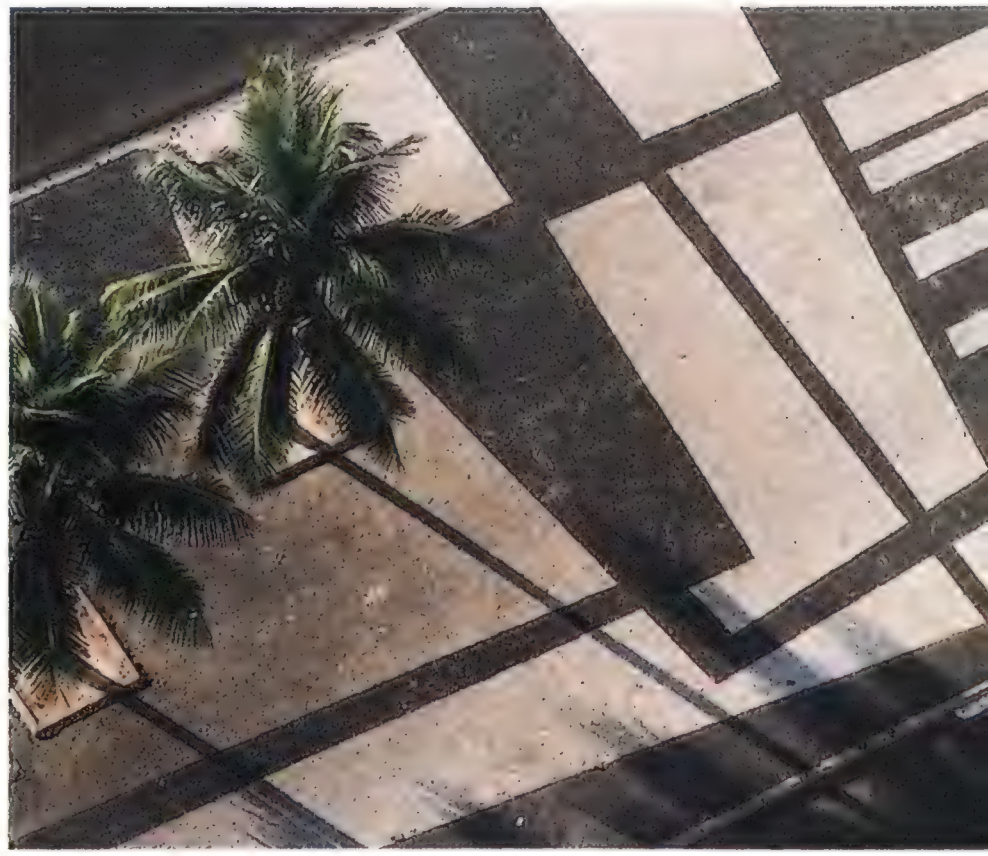
The natural-looking but carefully planned garden of Clemente Gomes contains many of Roberto Burle Marx's trademarks: water and water plants; a mix of spiky and round shapes; stone tiers and lush foliage.

Photographs by Farrell Grehan

Burle Marx's Flamengo Park in Rio de Janeiro provides an elegant sanctuary for public activities.

changed the way the people of Brazil and of other countries see and manipulate their surroundings. He pioneered the use of his country's native plants in gardens he designed, and has argued for lonely years against the destruction of Brazil's natural landscape. He creates gardens like jewels for his country's wealthy elite and makes parks like alms for its poor. He is known for designing six kilometers of sidewalks at Copacabana beach in Rio de Janeiro; the 70-hectare Parque del Este in Caracas, Venezuela; the 120-hectare Flamengo Park in Rio; and more than a thousand other parks and gardens in Brazil and elsewhere in the world. He has discovered 13 species of plants, 11 of which bear his name. He has received awards for his work from institutions in Belgium, Brazil, Canada, Chile, Great Britain, Italy, Nicaragua, the United States, Uruguay, Venezuela and West Germany. He paints, he makes jewelry, he designs floral arrangements. Most of all he has devoted a lifetime to creating works that, like his garden on Clemente Gomes' ranch, seek to establish a link of beauty between art and nature.

"Burle Marx and Larry Halprin [SMITHSONIAN, December 1988] are the two great landscape architects in the world," Ian McHarg, author of the book *Design with Nature* and a pioneer in ecological design, told me recently. "They are very different, but they coequally share that pedestal."



The famous six-kilometer-long sidewalk at Copacabana beach mixes dramatic mosaic patterns and palms.

Burle Marx's gardens run from intimate to vast; Flamengo Park covers 12 square kilometers of fill.

"I often think of Burle Marx as the Frederick Law Olmsted of Brazil," says Anthony Walmsley, a noted landscape architect based in New York, who worked with Burle Marx in 1962. "The fact that he has put art back in the profession, or made it very central, has a universal effect on the profession. What is so significant about Burle Marx's contribution—besides that it has lasted 60 years—is the way it has made an impact on all scales, from garden to landscape."

"Burle Marx is a survivor from the Renaissance," says Lucio Costa, Brazil's legendary architect, who designed, among other things, his nation's first glass-walled skyscraper, in Rio, and created the plan for the capital city of Brasilia. "He is a musician who makes music with plants," Costa says.

My encounter with Burle Marx was a pursuit from landscape to garden and back. At 80 years of age he is a Brazilian institution. In a country known for its exuberance, he is flamboyant. "He sings, he dances, he tells very funny stories," McHarg said. In Brazil you see his face—big, robust, energetic, with wild, wavy white hair and a mustache—on magazine covers and in political cartoons. And always, you hear about his parties—"old ladies playing the piano inside, a sort of samba school in the garden and Roberto singing everywhere," said someone who knows him—and his hundreds of notable friends.

My own travels with Burle Marx began with the journey to Gomes' vast ranch, to which I rode in the back seat of his club-cab diesel pickup at about 500 miles an hour. "It is so wonderful that you could come," he said; then we went careening through the streets of Rio, where Burle Marx pointed out huge tile wall murals he had done, his mosaic walkways at Copacabana beach and at Flamengo Park. We then hurtled south on the highways of São Paulo State, while Burle Marx sang opera, ate fried manioc balls, told the driver to stop when we passed flowering trees, exclaimed at the beauty of soap patterns when the driver washed the windshield, and mourned both the denuding of surrounding hills for coffee and cattle and the way Brazilians everywhere whitewash the first few feet of their shade trees. "They dirty them with white!" he shouted over the diesel's roar. He was pleased with the image. "Dirtied with white!"

Later I spent time at Burle Marx's home, a huge building surrounded by a hillside garden and greenhouses, which combined contain about 3,500 different species of plants. The building was full of tapestries, paintings, tile works, collections of religious icons, pre-

The author, who wrote on Brazil's rain forest in the November 1989 SMITHSONIAN, *went to boarding school in Teresopolis, near some Burle Marx gardens.*

Santo Antônio da Bica is Burle Marx's country estate. Deeded to Brazil, it is publicly maintained.

Columbian pottery, wood carvings, jewelry and floral arrangements—a mixture of antiquity and Burle Marx's own creations. Once we stood looking out across the bay at Guaratiba, and he spoke with the tones of a prophet: "In Brazil, we have more than 50,000 different plants and many plants that are still to be discovered! We need to understand that we have overwhelming richness." We looked at bursts of orchids, and he announced: "A garden must be constructed; there must be a balance between all the plants and all the rhythms. But you need to know how to stress what you want to say. If you don't know what you want to say it would be only an impulse. Art is impulse, but controlled impulse."

He seldom talked about his past. "Roberto does not do that," one of his many friends told me once, while we stood in a garden Burle Marx had designed in the hills above Rio. Lawns rolled off into crowds of agaves studded with tufts of pampas grass, huge rare philodendrons stood in groves, and a stream of water slipped away down a hill to help the garden blend into the surrounding wilderness. The garden was 34 years old, in its maturity; Burle Marx still visited it regularly to make sure it continued to express his goals.

It took a visit to a more reflective man to understand Burle Marx's past. The man was Lucio Costa, who, at 88, is the opposite of Burle Marx: quiet, undemonstrative, soft-spoken, modest. Costa is one of Burle Marx's earliest acquaintances. They met when Costa was 17 and Burle Marx, the son of a German father and a Brazilian mother, was 10. Costa recalled a child quieter than the man. "We lived on the same road," he remembered when I visited him in his modest apartment in Rio. "They had a large area in the back of their home, and his mother loved flowers, and he was very sensitive. He began like a flower himself."

"Weeds" of Brazil treated as treasures

The gardens of Brazil were European in style then, all roses and boxwood hedges. The magnificent tropical plants of Brazil's jungles were considered weeds. Burle Marx, who now seems to take violent delight or umbrage at everything, loves the big irony of his early life—that he had to go to Germany to learn the value of Brazilian plants. His parents took him to Berlin in 1928, when he was 19, and he studied both opera singing and art; but every day he was also drawn to visit the Dahlem Botanical Garden. "Roberto has a genuine affection for nature," said Conrad Hamerman, a Philadelphia landscape architect who is writing a biography of Burle Marx. "It is a direct physical thing." At the botanical garden, displays had been created around ecological associations of plants. There Burle Marx saw "weeds" from Brazil treated as treasures.

"I didn't know if I would be a musician or a landscape architect," Burle Marx said that afternoon in Clemente Gomes' new garden, while Gomes sang "Deep in the Heart of Texas" in the background. "But in Germany when I began to see the botanical garden, I began to discover plants that I had never seen, and they were Brazilians! On account of that I began to collect plants."

Back in Brazil, Burle Marx enrolled at the National School of Fine Arts, which was briefly directed by Lucio Costa. He studied painting. It was a period of turmoil and revolution in Brazilian art. "It was a very special time," Costa remembered. "We were trying to adapt architecture and art, because Brazil was very apart from what was happening in the rest of the world." Burle Marx joined a circle of artists in many disciplines who embraced modern art and architecture. "Usually," Costa remembered, "people who took

Phyllis Robinson is living proof that NordicTrack can take weight off, and keep it off.

(And make you feel better about yourself than you have in years.)

Phyllis Robinson is all too familiar with the infamous "diet rollercoaster."

Over the span of 20 years she lost 1000 pounds, and gained 1042 back.

That was before she discovered NordicTrack.

Take weight off. Keep it off.

Diets alone don't work. The only sure way to take weight off and keep it off, is to incorporate regular aerobic exercise.

NordicTrack is the best way to get that exercise because it duplicates the motion of cross-country skiing, the world's best aerobic exercise.

NordicTrack burns more calories in less time than any other exercise machine — up to 1,000 calories per hour according to tests at a major university.

And it's easy to use. Even if you've never cross-country skied.

NordicTrack. The time-efficient, total-body workout.

Unlike other aerobic exercisers, NordicTrack works all the major muscles in a smooth, natural way, and quickly elevates the heart rate to the fitness-building level.

It gives an effective upper-body, lower-body and cardiovascular workout in as little as 20 minutes a day, three times a week.

The closest thing you'll ever find to the fountain of youth.

NordicTrack provides other benefits as well.

Researchers are finding that it will retard the effects of aging — and actually reverse them to some degree.

By using NordicTrack regularly, you'll reduce your risk of cardiovascular disease, hypertension, diabetes and high cholesterol.

You'll also strengthen your bones and ligaments, which helps prevent stiffness, back pain, arthritis and osteoporosis.

And you'll improve your cardiovascular fitness — the key to maintaining the energy you need to do the things you love.

When you have your health, you have everything.

Improve the quality of your life. Call NordicTrack today.

NordicTrack
A CML Company

Free Brochure & Video

Call Toll Free in U.S. and Canada

1-800-328-5888

❑ Please send me a free brochure.
❑ Also a free video tape ❑ VHS ❑ BETA

Name _____

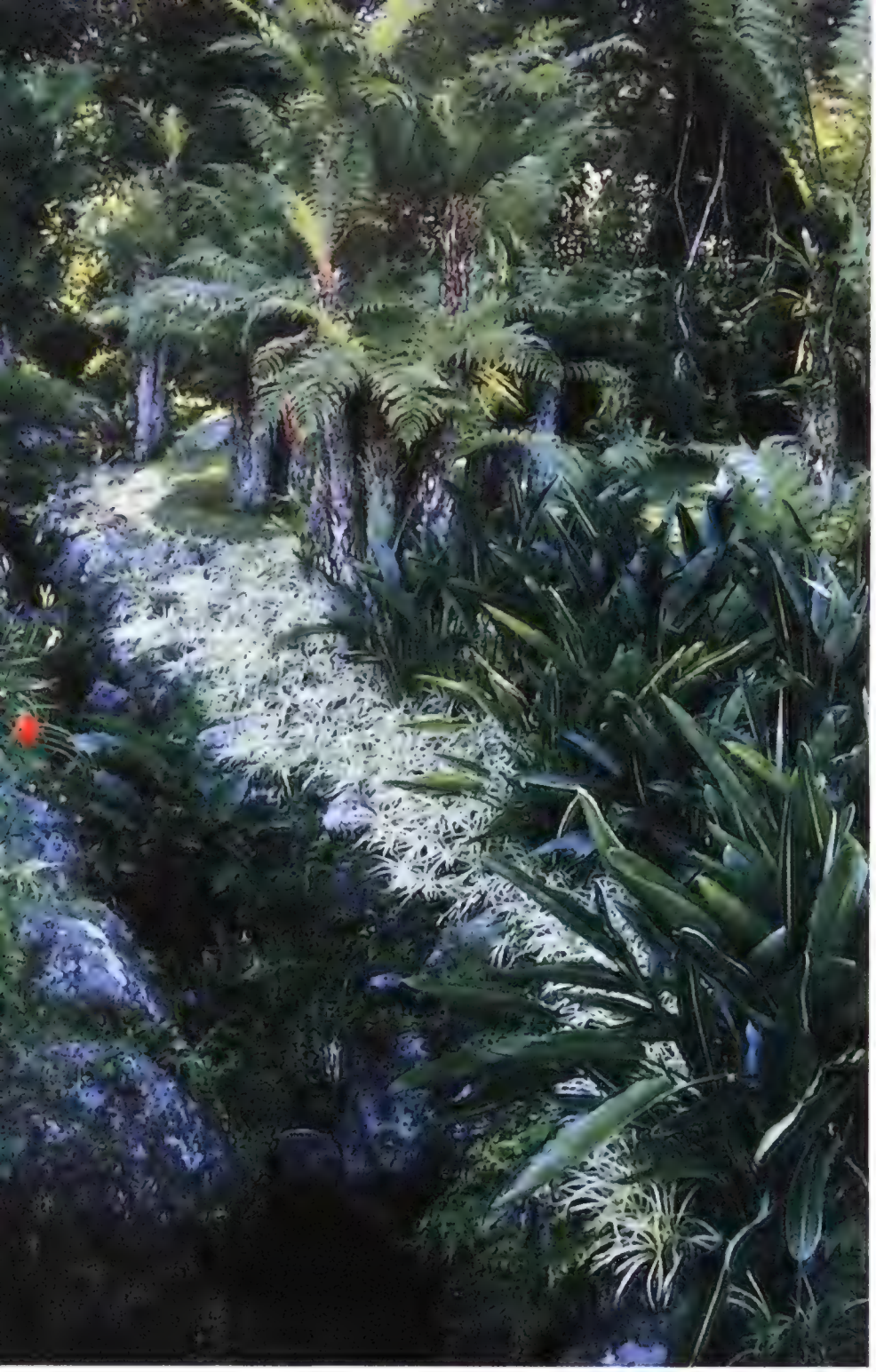
Street _____

City _____ State _____ Zip _____

Phone ( ) _____

141C Jonathan Blvd. N., Chaska, MN 55318

355G0



For grounds of a private home in a Rio suburb, Burle Marx blended the formal garden into the wilderness.

care of modern things despised older traditions. But the Brazilian modern art movement was not only a group of cosmopolitans trying to introduce modern contemporary things. They were also interested in the traditions of Brazil."

While he studied painting, Burle Marx collected plants and, almost as a hobby, continued to work with his mother's garden. Instead of roses and boxwood, he planted agaves and bromeliads, the plants of Brazil.

In 1932 Lucio Costa asked Burle Marx to design a garden for a residence in Rio. Two years later Burle Marx was appointed Director of Parks for Recife, the capital of the state of Pernambuco. There he seems to have found the connection between his passion for art and his love of nature that would drive him the rest of his life. He took the plants that most considered weeds and made parks with them. He designed one garden almost wholly around plants from the dry northeast, and others dominated by water and by a plant that would become one of his trademarks: *Victoria amazonica*, with its huge lily pads. Altogether he redesigned 15 squares for the city and put "weeds" in them all. This was shocking. In at least one case he removed a patriotic statue. And the use of what seemed to be weeds was even more controversial. "He was a fighter," Costa said. "He began as a fighter, exactly like Don Quixote. In the beginning he fought alone."

Two years later Burle Marx came back to Rio a different person. He had found his means of expression, and that freedom released his ebullience. "I don't know exactly how Roberto suddenly exploded," Costa said. "It is something rather mysterious. Suddenly he is Roberto Burle Marx. At the beginning I always felt he wanted help. But, like a bird, suddenly he feels his wings are stronger. He flies."

"It became a must to call him"

When Costa and a group of colleagues brought the ideas of Le Corbusier to Brazil in designing the new glass-walled Ministry of Education and Health building in 1938, it was Burle Marx they chose to design the rooftop and surrounding gardens. "He had the plastic sensibility for disposing of masses and color, like a painter," Costa said. After that endorsement, suddenly it was necessary to have every important new garden designed by Roberto Burle Marx. "It became a must to call him," Costa said. "Each architect who had a fine building, or a supposedly fine building, asked him to compose, to elaborate, to value the building with a proper garden."

A "proper garden" became a celebration of Brazil's own tropical nature, full of rich colors and abundance. Brazil's wealth of plant life was a weed patch no longer. Great swatches of vegetation were planted in curvilinear patterns that resembled the shapes in Burle Marx's abstract paintings. "A peculiarity of his gardens," Costa remembered, "is that he introduced the technique of painting; he is a painter, and he paints with plants also. He makes huge pictures with native flowers and plants."

"The landscapes are much more than paintings," Anthony Walmsley said. "He has an extraordinary sense of sites and their potential." No one design is the same. "I am always afraid of copying myself," Burle Marx told me once. "If you copy yourself you don't have any more imagination." Still, there is an unmistakable style that reflects the abundance of Brazil's natural vegetation, and the cultural impacts of its Portuguese and Indian heritages.

Burle Marx gardens are bold, rich, colorful. Lawns are sometimes planted in different species of grass, making long, clear edges of color and texture. Water

Measure time the way George Washington did... with this fine precision timepiece.

SHOWN ACTUAL SIZE.
HARDWOOD STAND INCLUDED.

Begin by setting the suspension ring to the local latitude.

Next, adjust the movable index to the current date.

Finally, turn the entire dial until sunlight coming through the pinhole in the index is focused on the hour ring.

THE NATIONAL MARITIME HISTORICAL SOCIETY PRESENTS THE UNIVERSAL RING DIAL

The Father of Our Country always treasured the precisely calibrated timepiece given to him by his close friend the Marquis de Lafayette.

It was the Universal Ring Dial, the fine instrument preferred by the wealthy and powerful for over 150 years. Now this precision timepiece is re-created in etched solid brass to inaugurate the official collection of the National Maritime Historical Society.

Pick it up. Turn the dial until sunlight coming through the pinhole focuses on the hour ring. And experience how Washington must have felt as he measured each dramatic moment in the birth of our nation.

Every numeral and letter—as well as the acanthus leaf design—is deeply etched into the imported brass. Priced at $90. Available only from The Franklin Mint.

THE UNIVERSAL RING DIAL

Please mail by July 31, 1990.

National Maritime Historical Society
c/o The Franklin Mint • Franklin Center, Pennsylvania 19091

Please handcraft The Universal Ring Dial in precision-etched solid brass expressly for me. And bill me in 4 monthly installments of $22.50* each, beginning prior to shipment. The hardwood base, instructions for use and historical reference will be provided at no additional charge.

*Plus any state sales tax and a total of $3. for shipping and handling.

Issued and authenticated by the NATIONAL MARITIME HISTORICAL SOCIETY of the United States.

SIGNATURE

MR/MRS/MISS

ADDRESS

CITY, STATE/ZIP

© 1990 FM

85737-49

An early assignment, still one of the architect's favorite designs, this private garden in Correias is notable for the skill and naturalness with which it was shaped and folded into the hilly landscape.

Spiky bromeliads, plants that were once scorned by gardeners, have become a Burle Marx staple.

He frequently uses giant water lilies, some as large as six feet across, to add drama to his gardens.

flows from pool to pool, where great leafy ships of *Victoria amazonica* sail in fleets. Where paving is necessary, Burle Marx has adapted the traditional Portuguese use of mosaic tile to make shapes at the same time strong and whimsical. Today, walking on these plazas and sidewalks of curvilinear patterns is like strolling across fields of windswept sunlight and many-colored shade.

After his "explosion," both Burle Marx's landscapes and his exuberance became known worldwide. Ian McHarg remembers one of his first appearances at the University of Pennsylvania, several decades ago. It was a frigid, gray November evening. "The hall was absolutely jam-packed," McHarg recalls. "People were sitting on windowsills, sitting in the aisles and crowding to put their heads around the door. Everybody was sort of wet, the radiators were gurgling, there was a good deal of steam."

The crowd gasped with delight

Into this gloom of grayness, Burle Marx brought slides. They were large-format slides and, projected, covered one whole end of the room. He read a brief introduction, then turned on the machine, McHarg remembers, and the whole room was suddenly illuminated by "incredible purple mountains, a viridian green forest and a thousand acres covered with yellow lilies." The crowd gasped with delight.

The other characteristic fragment McHarg remembers is of a party that happened about 25 years ago in Chestnut Hill, a suburb of Philadelphia. In the scene he recalls, about a hundred people are celebrating in a small house. Louis Kahn, the famous University of Pennsylvania architect (SMITHSONIAN, July 1979), is pounding on the piano. There is noise, music, smoke and laughter. And beside the piano, at the center of attention, with his shirt rolled up exposing his ample midriff, is Roberto Burle Marx. He is singing in Portuguese, German and French, and he is belly dancing.

Walmsley thinks that Burle Marx at 80 has slowed down a bit since those days. If so, it was barely perceptible to me. On another day we went dashing through the streets of Rio again, past the Botanic Gardens, with which Burle Marx often trades rare plants, to a ceramics factory, where he examined half a dozen 3-by-6-foot tile compositions he had designed, then back to his office in Rio's Laranjeiras district, where a German television crew was waiting to make a film of him. There were eight desks in the office, each with designers at work, two on private gardens and the rest on a major park for the state of Goiás. Against three of the four walls were stored hundreds of completed plans. They stood in tiers of vertical tubes, like organ pipes, holding the music of his many compositions.

"You see," Burle Marx said, waving his arm. "Tubicular gardens!" There are about 1,200 of them. Some of the designs have won awards; many have never been done. Gardens are like movie scripts—sometimes the money to complete them is never raised. Among the host of tubes was a major project Burle Marx recently completed for the city of Miami for a major renovation of Biscayne Boulevard. That project, which will cost $16 million (Burle Marx's fee was $70,000), is now under construction.

Parks for the public are clearly Burle Marx's favorite form of expression. "Creating a garden for a couple, let us say, gives me a pleasure," he said. "But it doesn't fulfill my purpose, which is to create a garden in which many people can have a pleasure. Through a garden we can educate people. For a work of art, it doesn't matter if you create a skyscraper or a jewel; the important thing is that you do your best. But when the purpose is to educate people so they can have a better way of living, I prefer it. It gives me a much stronger feeling that we are trying to find the lost paradise."

The huge window that made up most of one wall of the office looked out on an intimate scene of the backyards of homes. It was a closeup of tiers of buildings, trees, tightly laced bars on doors and windows, and slabs of sunlight on walls, cats, trees, garbage cans and window boxes. The next day, when I visited Burle Marx again at his estate outside Rio, I recognized many of the shapes and colors. They appeared—slabs of bright color crisscrossed by groups of black lines—in the abstract painting he was working on, on a large table, with the assistance of the 16-year-old son of one of the gardeners.

He slipped into intent, busy silence

Burle Marx worked fiercely, irritated by my presence. He became even more agitated by the arrival of three young journalists who wanted to arrange a photograph, in celebration of spring, of a seminude woman sitting on a *Victoria amazonica*. "The plant is beautiful by itself!" he said after they left. While he worked, his helper went darting off on errands, leaping over potted philodendrons on the way.

I tried to get Burle Marx to talk about his past again, but he would have none of it, talking vaguely about his mother ("Of course she loved plants") and then slipping into intent, busy silence. So I stopped asking questions and just watched, listening to the rough scratching of the brush on the canvas, while Burle Marx painted those crisscrossed bars, which struck me as a symbol of how constrained the colors of modern life have become. In the distance we could hear the *chink-chink* of men working on tile, and the sound of water falling in the garden. Burle Marx, who never

Collections of orchids and fanciful grotesques at his country estate reflect the artist's whimsical bent.

married, recently deeded the garden to Brazil, so it is now cared for as a public treasure, with a staff of gardeners who will maintain it after his death. "If I don't work every day I am nervous," he said after a while; "I'm afraid I am going to die."

Some of his intensity is directed at the damage he sees being done to Brazil's natural beauty all around him. "I see destruction; I see erosion," he said one day as we hurtled along the highway north out of Rio. "I do not see renewal." The state of the environment is one of the few subjects that does not give him joy. "It is a melancholy time for me," Burle Marx said a little later, as we drove through industrial smog along a river. "I am old and have not found a solution."

That does not prevent him from talking about it any chance he gets. Years ago, when Walter Gropius, the founder of the Bauhaus school of architecture, visited Brazil, Burle Marx complained to him about the ugliness of some billboards. "Did you speak against that?" Gropius asked him. Burle Marx answered no. Gropius chided him: "We have a moral obligation to speak against mistakes."

The words stuck with him. They drove Burle Marx, with his combined love for art and nature, to speak out, not about the ugliness of billboards, but about the damage being done to the land. He is so well known as a spokesman for nature that some years ago a newspaper cartoon showed a tree yelling for help to escape an ax, and Burle Marx, in a cape, flying to the rescue.

The day after we returned from our breakneck trip to Gomes' garden, Burle Marx—ten days before his 80th birthday—got up at 6:30 again and went zooming off to another ranch, where he was supposed to look at the site of a garden he was designing. But there a surprise awaited him.

Burle Marx was quite a sight himself

The surprise hit as he stepped out of the car at a dusty wide spot in the road, far from the elegant ranch houses owned by his hostess. She is one of the few wealthy Brazilians, a woman named Aparecida Mattos, who owns land all over southern Brazil. She wore several pounds of gold and diamonds at her neck and wrists, but Burle Marx was quite a sight himself. He wore a blue striped shirt, a brown herringbone suit, and a red-and-green polka-dot tie.

When Burle Marx arrived at the viewpoint, even he was struck almost silent. Out there on the dirt were about 150 people, two television crews and, in tidy formation, the 28-piece band of the Second Battalion of Military Police of Juiz de Fora, which struck up a march as he got out of the car.

He was stunned. "I did not expect this," he whispered to me, clearly moved. For once, his unsteadiness seemed real. He leaned on Mattos' arm and they walked up to a tall sign that was covered with a cloth. The band played "Happy Birthday." A friend yanked down the cloth and there was the sign that would overlook the new garden: "Roberto Burle Marx; to the Grand Master with Admiration and Friendship."

The television cameras rolled, and suddenly, in this most unexpected situation, surrounded by adulation, police, aristocracy and hills beaten to dust by his hostess' cattle, he was an environmentalist, arguing against the cutting of the Amazon forest and for the protection of Brazil's landscape. He spoke with heartfelt urgency, passing on again the message of his life: the importance of linking art, nature and human beings in search of the lost paradise.

"We need to show the people that to love the country we need to protect what we have," he said. "All the big countries—the United States, Germany, France, England—are destroying the world with their industry. It is not only Brazil. In Germany 30 percent of the forests are ill. Many plants in Canada are being destroyed by the acid rain that comes from the United States. I will plant trees on my 80th birthday to show

what we need in this country is renewal. I will show the people that that is my wish, the renewal of the forest. All Brazilians should work to protect our flora and fauna. We have the moral obligation to fight the mistakes."

Late in the afternoon, he went into the huge living room of the Mattos mansion and dozed off in a chair, while half a dozen members of the family sat around and whispered among themselves. I sat there with them, watching Brazil's Don Quixote of art and nature snore in the elegant room.

"Roberto Burle Marx seems to have produced no successors," McHarg had said once when I asked about the Burle Marx legacy. "But then, Frank Lloyd Wright never did either, and I don't think Le Corbusier did, so it may very well be that these extraordinary people don't produce successors. But he's had a profound influence with everybody."

"I think of Burle Marx as the Picasso of landscape," Walmsley had said. "No one's going to do exactly the same thing. But his influence will be immense. I am sure there will be retrospective exhibitions on and on, because the output is so extraordinarily large, diverse and impressive. But this universal spirit, the impulse, is what people will remember, rather than trying to reproduce the forms. They'll remember this exuberant desire and ability to create things that are wonderful."

The scene I remembered, as I watched Burle Marx sleeping, was that day at Clemente Gomes' garden, with Gomes murmuring in Russian and doing a little shuffle dance while Burle Marx sang. He was at home there, with plants, water and nature all around him, his life still as ebullient as his landscapes.

"When I first made a garden I made a salad," he had said. "Now I think of Mies van der Rohe: less is more."

Gomes sang, "I do not walk alone."

"Even in a man's life it is beautiful to be born," Burle Marx said, rolling the last words. "It is beautiful to grow; it is beautiful to love; it is beautiful to end, to die. If we don't understand that rhythm of life, we won't understand the rhythm of nature."

Gomes murmured, "Balance is for balance."

"I hate formulas," Burle Marx said. "I love principles."

Clemente Gomes looked at him and said, solemnly, "You are a free man."

"Through a garden we can educate people," Burle Marx says; parks like this square near Rio's airport offer the city's pressed millions places of spaciousness and subtle reminders of Brazil's floral heritage.

YOUR DOLLAR'S WORTH

ARE YOU GETTING IT?

Some steps we're taking at Lands' End to make sure you do from us.

From the very beginning at Lands' End, we've said: "We're not just out to make a sale to you, we want to build a relationship." In today's uncertain marketplace, alive with all sorts of artificial incentives, promotions, and other sales stimulants, however well-intentioned, it seems appropriate to reaffirm our commitment to you.

That commitment stands, as it always has, for quality first, then a price that assures value, and always, always service.

We don't propose to tell you what you want. Nor do we try to read your minds. We do, however, read the mail you send us. We listen to what you have to say on the phone.

And we try to shape our offerings to meet your needs which, these days, understandably, are concerned with getting your dollar's worth.

There's the matter of our pinwale corduroy skirt

It first appeared in our catalog in September, 1986—a fully-lined skirt, beautifully made from the finest Japanese pinwale corduroy, obtained in modest quantity through an importer, and in those robust times, a sound value at $49.50. You liked it and said so.

A year later, in September 1987, it became an even greater value. We were able to import the material ourselves, choose our own manufacturer, and offer you the same skirt for just $36.50—the kind of thing Lands' End loves to do whenever feasible.

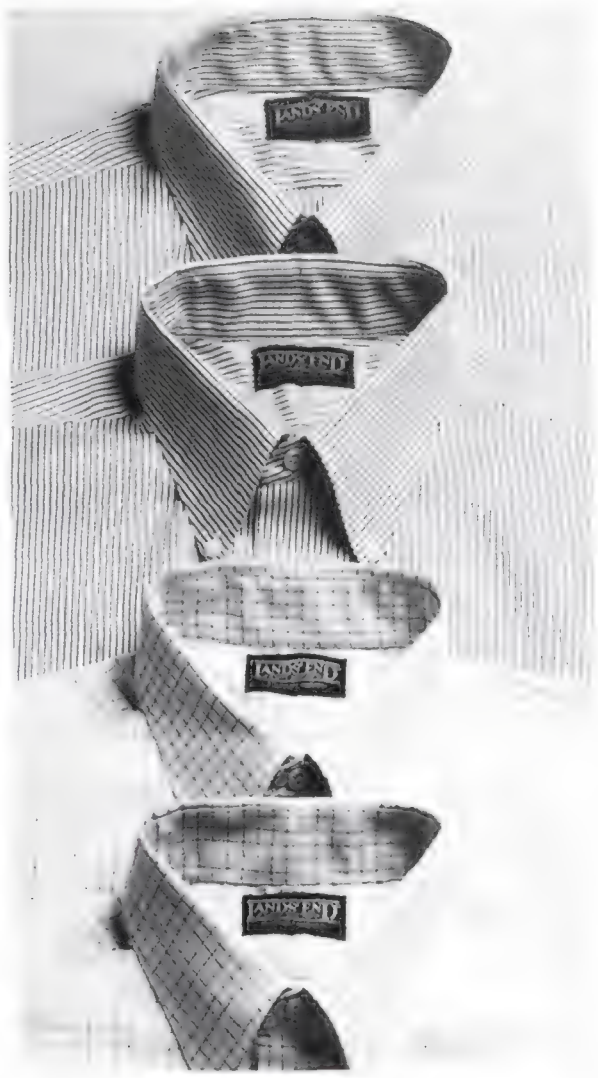
Ah, but then came 1989. The price of material and costs of manufacture rose substantially. Try as we might, we couldn't hold the $36.50 price. We had to go to $42.50—still a solid value for the dollar, but you had second thoughts.

Then a curious thing happened

Some of you wrote wondering if we could possibly offer a corduroy skirt that wasn't lined, that you could throw in the washer, and thereby save the time and expense of dry cleaning.

We got the message. And today—without doing anything to that skirt but remove the lining—we can offer it to you fully detailed at just $34.50—the best "dollar's worth" we've been able to deliver yet, for what you indicate you really want—a quality skirt you can machine wash!

There's a postscript, but an important one: for those who still want the ultimate fully-lined skirt it's still available at $42.50—just as sound a value as it ever was. Look for both skirts, starting in September.



Come Fall, a few more surprises

Lest you men suspect us of showing favoritism, here are two steps we're taking in your behalf.

The first involves our Pinpoint Oxford shirt—a demonstrably exceptional value at our $33.50 price. (You'd do well to get a comparable pinpoint elsewhere for $10 more per copy.)

Now then, because we now are by far the largest consumer of 100% quality pinpoint fabric—and taking advantage of the present economy—we have entered into a contract to buy a volume of material so sizeable that we can offer this same pinpoint shirt—complete in every detail—for just $29.50. Admittedly, we are wagering that the increase in sales volume this step will stimulate warrants our taking less of a mark-up. A risk, yes, but what are friends for?

LANDS' END® DIRECT MERCHANTS

©1990, Lands' End, Inc.

And finally, consider a dress trouser under $60!

It is scheduled for offering starting in July—not just a single trouser, mind you, but a full range of trousers in the $50 to $60 range. Trousers of the same fine material you expect in a Lands' End pant, and the same attention to basic manufacturing detail—including an optional plain or pleated front. What have we left out? The watch pocket. And full-taping of interior seams. But then, again, for under $60 you can now dress suitably for the workplace. And should you still wish the full elegance of our $75 to $90 trousers, they're still there for you as well. Both lines, understand, deliver your dollar's worth. GUARANTEED. PERIOD.*

All this, and the Lands' End experience, too

A toll-free phone call brings the catalog (1-800-356-4444). A leisurely riffle through its pages tunes you in to other solid values. A phone order received today usually leaves our premises tomorrow. Or even sooner if you elect Federal Express. You don't start the car, drive it, or try to park it. You pick up the phone, and lean on your elbow. And, whatever you order, you get your dollar's worth, you can bet on that.

We do, day in day out.

Please send free catalog.
Lands' End Dept. B-77
Dodgeville, WI 53595

Name _____

Address _____

City _____

State _____ Zip _____

☐ Please send information about your new international service.

Write or call toll-free:

1 800 356 4444

By Joseph Kastner

The 'miracle' on Jamaica Bay didn't happen overnight

It has taken years and many volunteers to change this area from a New York dump into something approaching a birder's paradise

Wrecked boat, tires, other trash, littered beach at Dubos Point before volunteers cleaned it up last fall.

You might have mixed feelings about asking Jasper Danckaerts to come back to Jamaica Bay, a modest body of water on an edge of New York City. When he was last here, he said: "We sometimes encountered such a sweet smell in the air that we stood still" to breathe the fragrance of peach and apple blossoms. The bay, he was pleased to see, was "well provided with good creeks for . . . fisheries," and the settlers made good use of it. Their cows fed on the marshes and so did they, going out "to shoot snipe and wild geese."

If Danckaerts did come back today, after three centuries, he would find the bay surrounded by a city whose settlers have made very bad use of it. He would encounter the smell of auto fumes and garbage dumps, and see sewage in the creeks. If he were to eat the polluted bay's crabs and flounders regularly, he could soon be certified as a toxic waste site. If he continued the journal he kept, it would tell a disheartening story of urban degradation. But he could add a sequel of restitution and redemption.

Multitudes of waterfowl and countless shorebirds fly over the dense metropolis to alight here. Ibises come up from the tropics to nest in summer near the subway line, and Arctic owls come down from the tundra in winter to feed at airport runways. Aromatic camphorweed sprouts from mounds of rubbish at the tidelines, and bluefish chase schools of herring into the bay to corner them in littered coves. A hawk saunters through the air, past the towered Manhattan skyline, which is draped across the horizon like a theater backdrop.

The bay sits just inside New York City's most heavily populated boroughs, Brooklyn and Queens. A crow would cover some ten miles flying from the Empire State Building to the eastern shore of the bay, where, as it happens, a lot of crows hang out. The narrow Rockaway peninsula separates the bay from the Atlantic Ocean, whose tides come in to flow slowly around it. It is 40 square miles of shallow water (and many additional miles of shoreline), but it used to be even larger. After the Civil War, the expanding city started dumping the rubble of construction into its marshes and using the filled land to build factories and homes. Almost every inch of today's shoreline is man-made. The bay itself was dredged to build roadways and embankments, and in a monstrous dig, 53 million cubic

Now that they've gotten the peninsula set aside as a park, local conservationists have to take care of it.

yards were taken up to build the John F. Kennedy International Airport (originally known as Idlewild) on the eastern side. Many travelers know Jamaica Bay as the last body of water their plane skims over before landing on a runway.

Meanwhile, neighborhood garbage dumps grew into municipal mountains. Fish oil factories and animal rendering plants filled the air with noxious smells. Sewage plants and industries flushed unfiltered wastes into the bay. It was illegal to fish commercially in the polluted waters. If you swam in them, the sad joke went, you would dissolve before you drowned.

By the middle of this century, the bay seemed all but hopeless—not dead but failing fast. Natural cleansing processes were hampered by all of the dredging, which had deepened the channels so much that by 1984 the fresh ocean waters—which once took two weeks to circulate around the bay—now took a month. One deep area left by dredgers mixed sediment and toxic heavy metals into a gunk known as "black mayonnaise."

Across from the airport, sharing the bay's miseries, sat Conchs Hole Point, a small peninsula now called Dubos Point Park. René Dubos, who died in 1982, was a distinguished microbiologist; his discoveries were crucial to the development of modern antibiotics. He was also a philosopher of the environment, an elegant thinker whose writings influenced a whole generation of ecologists and won him a Pulitzer Prize. He described himself as a "despairing optimist," saddened by what Man had done to the land, cheered by what

Photographs by Wayne Sorce

Showing the way in Jamaica Bay

Bernie Blum, who lives close by the onetime dumping ground, began crusading for the park 20 years ago.

In aerial view (opposite), Dubos Point juts out into bay beyond brick apartments. Manhattan is on the horizon.

Neighborhood kids help tidy up the point, which now looks more like an authentic park than an urban dump.

Students from a nearby high school learn how to strip marsh grass seeds, which they'll sow around the bay.

we could do to make up for it. In workable ways, he preached, Man can restore and even improve on nature. "Think globally," he instructed. "Act locally." Jamaica Bay was his ecological pet, and his intervention stopped an environmentally disastrous expansion of the airport.

Dubos Point serves neatly as a text for its namesake's sermons. The first thing you confront as you walk out there is an old Cadillac body resting in a thicket of goldenrod and poison ivy, with a fleet of other wrecks hiding in the brush behind it. The path is paved with chunks of old concrete, rotting wood and moldy plasterboard. Your shoes crunch on broken glass and clamshells and the skeleton of a chicken head (the remnant, you're told, of a voodoo rite), and then you come, astonished, upon a lovely bed of purple gerardia, with a buckeye butterfly feeding on a blossom, and a couple of plastic bleach containers sitting on some others. Across the water, at the foot of the Edgemere landfill, two snowy egrets are fishing. A casually kicked beer can startles a snipe out of the reeds and a great blue heron out of some wild cherry trees. A worn-out Firestone tire lies half sunk in the sand, and inside its wall a colony of periwinkles, mussels and tiny crabs have set up their own little ecosystem. Some blue crabs are slowly simmering in a battered pot over a small fire, and the cook is fishing close by. Don't eat anything that comes out of that water, he is warned. You could get very sick. That would be a shame, he answers with a lilting

Caribbean inflection, and he goes right on fishing.

In a world of pure justice, someone might have suggested that Dubos Point Park be renamed Bernie Blum Park. That would be a complete antithesis. René Dubos was urbane and cogent. Bernard J. Blum is blunt and vociferous, and his response to your telephone answering machine's request for a brief message could be a ten-minute monologue. He is the local factor in Dubos' "globally-locally" equation. If René Dubos was a despairing optimist, Bernie Blum is a fulfilled Cassandra. He has an informed interest in nature and a proprietary passion for the point. More than 20 years ago, he began crying woe over what was being inflicted on it. He mapped the sites where stolen autos were being abandoned, where waste oil was being poured, and where, to his puzzlement, somebody had dropped a truckload of lawbooks, including the complete statutes of the State of New York. Otherwise-tidy neighbors were using the point for dumping their rubbish.

The land belonged to the city, and Bernie began a crusade to get it made into a park. He enlisted anyone who would listen to him and a great many who didn't want to—the community board, conservation groups, city commissioners, national park workers, city park officials, environmental task forces, local schools and the Friends of Rockaway, an organization consisting of Bernie as president and what he describes as a "tiny little following which isn't always following." Insistent, relentless in his demands for recognition and credit, Bernie saw his doleful prophecies come true. Trash begot trash, bad got worse and developers talked of building on the point. As the years passed, Bernie gained allies—and often lost them. Some took up the cause independently and with more practical effect. Al Appleton, a former state attorney who volunteered tirelessly for the New York City Audubon Society and has recently been made the city's environmental commissioner, heard about the point, and in early 1984 began working on a plan with the city's parks commissioner to make the area into a park. The Audubon Society and another conservation group, the Trust for Public Land, produced a detailed survey of Jamaica Bay's unprotected lands.

What had been a cause now became a viable project. After years of maneuvering, the deal was worked out and the point was made into a park, with the Audubon Society taking care of it. Bernie didn't play much of a role in the negotiations, but in 1988, when the deed was finally done, he was involved again. He had written the Parks Department several years earlier proposing that Conchs Hole Point be renamed Dubos Point Park. Having made the first moves, Bernie Blum now had the last word.

For Marc Matsil, Dubos Point Park is a battle won in

Joseph Kastner is the author of A World of Watchers, *a history of birding. He wrote on Andrew Jackson Grayson in August 1988 and sparrows in November '86.*

Marc Matsil, a New York parks official, inspects a marsh he's trying to protect from development in Brooklyn.

a war that has not been. As director of the Division of Natural Resources in the New York City Parks Department, he helped lead the campaign for the point and now oversees it. Matsil is shrewd and dedicated and has been around. He spent two years making a census of whales and seals in the Arctic Ocean, and taking vacations in Paris as in-house playwright for a theater of the absurd. He is not easily satisfied. All around the bay are other pieces of land he aches to rescue from development. At Four Sparrows Marsh (above), on the western side, some 80 acres lie right off six lanes of frantic traffic. Matsil walks in, kicking at the rubble and pushing through a jungle of mugwort, to a mudflat.

Not much here to promise a park—eroded iron pipes, slimy logs, tight rows of houses hemming the water. Then, framed by the skeleton of an old barge, an egret appears, stepping delicately through the ooze. Right behind comes a smaller one. "Baby hatched here," Matsil explains. He strides to the top of a grassy island. Before him stretches a glistening expanse of amber marsh grass and backlit water. A northern harrier glides by and an American bittern perches on a derelict boat. Matsil surveys his disheveled Eden. "Pristine," he says, and he wants it all. But other city agencies want to sell it to builders: New York needs cash and jobs. Matsil sighs and, as he walks out to the highway, stops to break a stem off a weedy plant. A sharp fragrance springs from the crushed leaves. "Wild pepper," he says, hope back in his voice.

He goes on to Fresh Creek, a couple of miles away. It's one of the last meandering streams in the city—only a mile and a half long and some 30 yards wide, with its sources paved over. On this balmy afternoon there are some egrets on a small island, some mallards on the water, a monarch butterfly on a milkweed. The stream seems innocent of what is happening up on its banks. There, enlarging an already huge apartment complex, trucks are dumping loads of fill, and bulldozers are pushing it around. The dense clay smothers small trees. Boulders hang on the brink. Matsil stomps across the fill, torn between rage and mortal despair.

During the past 50 years, about half of the bay's shore and island area has been made into parkland, much of it by bits and pieces. In 1988 the Trust for Public Land pulled off a real estate legerdemain of trade-offs and tax exemptions to get part of Motts Point for a state park. Currently the National Audubon Society is in court fighting for a few nearby acres that had been bequeathed to it and were then taken away by what the organization charges was a coerced will. By far the biggest section of parkland is the Gateway National Recreation Area. Its base is the old Floyd Bennett Field at the southwestern corner of the bay, where, in the days of aviation pioneers, Amelia Earhart, Wiley Post and Wrong Way Corrigan took off on their historic flights. After the war the facility was deactivated, and it eventually ended up with the city's Parks Department. That agency handed over to an amiable horticulturist named Herbert Johnson the formidable task of making the deteriorating airfield and other untidy wetlands into a nature preserve.

Johnson's main qualification for the job was his experience in breeding and testing grasses for golf courses, but he set out purposefully to save the bay. He planted indigenous shrubs and trees, and enough beach grass, it was calculated, to make a walkway from the bay to Boston. Barren uplands grew into small woodlands, and eroding tidelands into protecting

Visitors glass mute swans at the Jamaica Bay Wildlife Refuge, one of the world's top urban birding spots.

marshes. An enlightened piece of political bullying gave Johnson a chance to make a big improvement on nature. The Transit Authority needed permission to dredge the bay to build a causeway. It could do that, decided the parks commissioner (none other than the estimable Robert Moses), but only if it built two freshwater ponds. The bargain was made, and around the ponds Johnson created a nature sanctuary. Birds that prefer fresh water—ibises and night herons, for example, and many kinds of ducks—now came to the bay. Frogs, toads and turtles appreciated the new habitat. So did nature-watchers, who discovered that it was possible to walk from a subway station into a wildlife refuge.

In 1972 the city ceded its Jamaica Bay parklands to the National Park Service, which formed the Gateway National Recreation Area out of the bay and other wetlands around the metropolitan area. By the mid-'70s, the bay was showing signs of recovery—through Johnson's work, through environmental laws and popular pressures. The city was forced to treat its sewage wastes, and Kennedy airport was required to control runoffs of oil and fuel. Industries were monitored. The bacteria count in the bay's waters was dropping. With commercial fishing forbidden, the bay has become once again a major breeding ground and nursery for flounder and bluefish, and its bottom supports untouched populations of crustaceans, shellfish and the microscopic organisms that are the base of aquatic food chains. The bay still may not seem an entirely wholesome environment for people, but life for some of its other inhabitants may actually be richer than it would be in purer waters.

The airport runways, both the idle ones at Floyd Bennett and the busy ones at Kennedy, have been a blessing to displaced birds. The constant clearing of brush and shrubs necessary to keep the runway areas open has created large stretches of grassland. Years ago grasshopper sparrows, upland sandpipers and horned larks nested in the ancient grassy plains on eastern Long Island. When housing tracts destroyed the plains, the airport grasslands were waiting to provide alternative nesting sites. At Kennedy, upland sandpipers now lay their eggs, hatch and bring up their young barely 12 inches from the runways. The thundering jets and quaking terrain do not addle the eggs or frighten the fledglings.

One of Dubos Point's neighbors feeds two other local residents in the backyard of his home in Queens.

Starr Saphir, Audubon instructor and lifelong birder, escorts one of her classes on a tour of the refuge.

The airport has other attractions for birds. Gulls bathe and preen in pools that form on the runways when it rains. Hawks and owls come to hunt jackrabbits. When some laughing gulls built nests in Joco Marsh a few years ago, the activity was greeted as a landmark in the bay's comeback. They hadn't nested anywhere on Long Island for almost a century. But Joco Marsh is only a quarter of a mile from runway 4L at Kennedy, and the airport, seeing a threat to air traffic, is reluctantly taking steps to discourage the multiplying gull population.

Once there were grandiose plans to build the bay into a huge international seaport. Today, the plans

forgotten, it serves as a port only for local shipping (mostly oil barges) and a great many private pleasure boats. It also serves as a science laboratory for Beach Channel High School, which is built on its shores. Its waters provide specimens for zoology dissections and samples for chemistry-class analysis. The plants and terrain of Dubos Point are texts for botany and ecology courses. In their science rooms, along with tanks of eels and Fowler's toads and pipefish, the students have a tongue-in-cheek exhibit of the bay's unique habitat—crunched beer cans, a shoe circa 1900 and a 50-year-old Hennessy cognac bottle.

On a bright autumn Saturday, the students are out at Dubos Point. It is Cleanup Day, but before they start tidying up the place they get a botany lesson from Lou Siegel, who is head of the science department. Siegel shows them how to bend the stalk of *Spartina alterniflora*, uncover the seed heads and shake out the seeds (p. 112). The students scatter some of their harvest on bare pieces of beach and save the rest to plant in flats so they can set out seedlings next spring.

Then the class goes out to help other volunteers who have been gleaning the litter. Big plastic bags are filled with cans and bottles. Bathroom tiles pile up beside old mufflers and car springs. A long line of auto chassis looks like a study for some avant-garde sculpture. The paths are neatly raked, and Conchs Hole Point begins to look and feel a little more like Dubos Point Park.

You can see what Dubos may eventually become by going to Gateway's Jamaica Bay Wildlife Refuge, out in the middle of the water, flanking a multilane highway. This is where the freshwater ponds were built. When Herb Johnson first started working here, some 60 bird species had been counted. Now, including spring and fall migrants, summer nesters and winter residents (and, yes, with more watchers to count them), the number is up to 326 species. This is one of the world's greatest year-round birding spots, and arguably the best to be found anywhere within a city's boundaries.

Oldtimers had to bushwhack through brambles and brush to get within sight of the water. Now, graveled paths lead you around the marsh, and pruned bushes give you good sight lines. But the neatness does not drive away the sense of wildness. Nor do the cliffs of condominiums walling the horizon, nor the jet trails marking up the sky. For the many city people who come back here again and again and feel a protective affection for the bay, these intrusions only emphasize the isolated loveliness.

Starr Saphir comes to the refuge regularly with flocks of her birding students. A former actress and a lifelong birder, she works as a freelance naturalist and frequently conducts birding tours for Audubon. As she goes along now, she delivers an ornithological monologue. In the sumac over there at 2 o'clock is a white-eyed vireo. What is that duck sleeping on the pond? A green-winged teal. That statuesque figure on a log is a double-crested cormorant airing its outspread wings. Starr stops and gives a loud *pissh-pissh*. A golden-crowned kinglet answers with a soft *teee-teee-teee*.

While the group sits down beside one of the ponds to tally the day's score—47 sightings and a song sparrow heard but not seen—you go across the highway toward the other pond. The shore is beyond a row of bushes, but a female mallard is heading for the water and you follow, thinking she will guide you to a break in the barrier. She does, but though the duck goes through, it is too low for you to manage. As you walk across a field of sedge, you look down, and underfoot are patches of a wild orchid—nodding ladies' tresses, with their tiny white flowers spiraling up a still stem. You pick your way carefully—nobody steps on an orchid.

At a wooden blind the pond opens like a child's pop-up picture book. Northern shovelers feeding on duckweed float with their heads submerged and their rumps tipped up. Mute swans rest near a flock of brant. In a cove, six black ducks share a log with five turtles, while a belted kingfisher perches on an owl box nearby. A flock of snow geese come up off the water, black tips etched on their wings. The air seems syncopated as some herring gulls, flying with steady four-four wingbeats, cross a line of cormorants flapping their wings in staccato sixteenths. The ducks quack, the brants purr, the kingfisher rattles. A subway train comes clattering across the tracks at the back of the pond, but just then some noisy Canada geese fly by and you don't hear the train at all.

Waterfowl and marsh grass at sunset transform the once-ruined bay into something very close to splendor.

The Great 89¢

CHOOSE ANY SIX MOVIES

INDIANA JONES & THE LAST CRUSADE
9106042

ROMEO & JULIET (ROYAL BALLET)
5196032

RAIN MAN
2869062

NATIONAL GEOGRAPHIC:
LOVE THOSE TRAINS
7842072

THE LAND BEFORE TIME
5822052

TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER
TURNER & HOOCH	8503052	PICNIC	5971042	ROLLING STONES 25x5: THE CONTINUING ADVENTURES	2940092	K-9	5834012
MURMUR OF THE HEART	2380062	SEX, LIES & VIDEOTAPE	5963042			SEA OF LOVE	9204052
CHANCES ARE	5932022						
NEW YORK STORIES	8500082						
COUSINS	4472012						
ROBOCOP	2350022						
SCARFACE (1983)	2168042						
CHARLOTTE'S WEB	2095282						
WILLOW	1982002						
ANNIE	1516132						
GHOSTBUSTERS	1742682						
JANE FONDA'S COMPLETE WORKOUT	6359042						
ON GOLDEN POND	0523572						
EDDIE MURPHY: RAW	4392082						
MY STEPMOTHER IS AN ALIEN	5902082						
THE UNTOUCHABLES	4321042	SEE NO EVIL HEAR NO EVIL	5942002	LOOK WHO'S TALKING	5979062	COMING TO AMERICA	4416002
GORILLAS IN THE MIST	5804072			SAY ANYTHING	3720032	MISSISSIPPI BURNING	2373052
CAMELOT	6027482	MICHAEL JACKSON'S MOONWALKER	4686032	GANDHI	1533042	PREDATOR	3649012
A FISH CALLED WANDA	3675082			TO KILL A MOCKINGBIRD	1022282	ALIEN	0002812
OUT OF AFRICA	2131162	GREASE	2074312	STAR TREK II— THE WRATH OF KHAN	2013352	THE STING	1005292
AN OFFICER AND A GENTLEMAN	2021352	THE MUSIC MAN	6147012			CLARA'S HEART	6372072
		THE ACCUSED	4418082	DIRTY ROTTEN SCOUNDRELS	2372062	BATTERIES NOT INCLUDED	6810072
BILL & TED'S EXCELLENT ADVENTURE	3912012	STAR TREK IV— THE VOYAGE HOME	4306112	COLORS	2355072	OLIVER!	1760242
PLATOON	6500282	ADVENTURES IN BABYSITTING	5486022	STAR TREK— THE MOTION PICTURE	2035212	DOCTOR DOOLITTLE	0732212
THROW MOMMA FROM THE TRAIN	2351012					THE GODS MUST BE CRAZY	7340042
BEVERLY HILLS COP II	4319082	PLANES, TRAINS AND AUTOMOBILES	4394062	THE BRIDGE ON THE RIVER KWAI	1606302	THE QUIET MAN	4032122
CROCODILE DUNDEE	4297122					RAMBO III	7975062
ROMANCING THE STONE	0894252	SESAME STREET PRESENTS: FOLLOW THAT BIRD	6117232	STAR TREK III— THE SEARCH FOR SPOCK	2016322	HELLO, DOLLY	0609472
BEVERLY HILLS COP	2053362	SHORT CIRCUIT 2	5906042			IRON EAGLE II	7991062
CHOCOLAT	2381052	PINK FLOYD—DELICATE SOUND OF THUNDER	4627052	ALIENS	3609252	THE LAST UNICORN	0655022
SCHOCKER	9202072			CLEOPATRA	0579432	FUNNY GIRL	1511262
				TOOTSIE	1509122	COCOON	3[illegible]
				FULL METAL JACKET	6325052	OVERBOARD	3667022
				SHORT CIRCUIT	3607192	THE GRAPES OF WRATH	0531572
				THE TERMINATOR	6528182	ACCIDENTAL TOURIST	6386012
				HARRY AND THE HENDERSONS	2219032	THE BIG CHILL	1527692
				BULL DURHAM	2360002	CABARET	4001502
				GIANT	6080182	FROM HERE TO ETERNITY	1917002
				THE WITCHES OF EASTWICK	6323072	DEATH WISH 4: THE CRACKDOWN	3448[illegible]32
				APOCALYPSE NOW	2001132		
				THE DEER HUNTER	2124152	M*A*S*H	[illegible]
				THE CARE BEARS MOVIE II	1862132	LITTLE SHOP OF HORRORS (1986)	[illegible]
				ABOVE THE LAW	6336022		
				THE PRINCESS BRIDE	1250052	THE GREEN BERETS	[illegible]
				MOONSTRUCK	2716012	RED HEAT	[illegible]
				STAND BY ME	1924432	THE LONGEST DAY	0577602
				BLAZING SADDLES	0012482	MARRIED TO THE MOB	[illegible]
				AN INNOCENT MAN	8505032	LETHAL WEAPON	[illegible]
				THREE FUGITIVES	8501072	RETURN OF THE JEDI	[illegible]

THE LAST EMPEROR
1974002

DR. ZHIVAGO
0026002

HOLLYWOOD'S GREATEST MUSICALS

FIDDLER ON THE ROOF	0551032
AMADEUS	6529092
BEN-HUR	2603072
THE MALTESE FALCON	0508072
CASABLANCA	0507082
MY FAIR LADY	3507022
WEST SIDE STORY	0505002
MAME	6091072
PAINT YOUR WAGON	3049072
ON THE TOWN	2515042
SEVEN BRIDES FOR SEVEN BROTHERS	2518012

SINGIN' IN THE RAIN
2554062

E.T. THE EXTRA-TERRESTRIAL™
6811062

FAMILY FARE

AN AMERICAN TAIL	2184042
THE BLACK STALLION	0504012
CHITTY, CHITTY, BANG, BANG	0548092
GHOSTBUSTERS II	5944082
BABAR: THE MOVIE	8133032
HONEY, I SHRUNK THE KIDS	8504042
PARENTHOOD	5841022
UNCLE BUCK	5838072
WHO FRAMED ROGER RABBIT?	5499072
BEETLEJUICE	6330082
TEENAGE MUTANT NINJA TURTLES: THE EPIC BEGINS	7986032

DO THE RIGHT THING	5840032	LICENCE TO KILL	8802032
INDIANA JONES & THE TEMPLE OF DOOM	9107032	WHEN HARRY MET SALLY	3914092
		THE ABYSS	8811022
CHARIOTS OF FIRE	6014432	EMPIRE OF THE SUN	6332062
THE LOST BOYS	6315072	THE GLENN MILLER STORY	2130412
BLUE HAWAII	0673302	JEWEL OF THE NILE	3571602
BIG BUSINESS	5494022	PEGGY SUE GOT MARRIED	3629472
STAKEOUT	5488002	JUMPIN' JACK FLASH	3627072
THE KARATE KID	1710412	CHINATOWN	2025232
BRIGADOON	2542352	48 HOURS	2022262
SILVERADO	1810242	GREMLINS	6082242
FERRIS BUELLER'S DAY OFF	4273102	THE NATURAL	1649132
QUO VADIS	2681022	RIKKI-TIKKI-TAVI	7908082
DIRTY HARRY	6017572	CHILDREN OF A LESSER GOD	4294152
THE SHINING	6103292	THE MANCHURIAN CANDIDATE	2787052
WHITE CHRISTMAS	2072252	BRIGHT LIGHTS, BIG CITY	2792082
LA BAMBA	1963032	2001: A SPACE ODYSSEY	0025192
TERMS OF ENDEARMENT	2014262	SHENANDOAH	1019232
IRON EAGLE	3588202	SHANE	2073162
THE KARATE KID II	1894152	ALIEN NATION	3698012
CADDYSHACK	6023262	FLETCH LIVES	5823042
SHOOT TO KILL	5490062	ERNEST GOES TO CAMP	5484042
GOLDFINGER	0539182	A NIGHTMARE ON ELM STREET 4: DREAM MASTER	5713072
BODY HEAT	6020112		
GIGI	2508112	MEET ME IN ST. LOUIS	2529162
TUCKER	4417092	THE WAY WE WERE	1529262
WALL STREET	3661042	POLICE ACADEMY V	6333052
FLASHDANCE	2018222	ARTHUR	6024332
NORTH TO ALASKA	7310262	IMAGINE: JOHN LENNON	6368032
MIDNIGHT RUN	5286042	WITNESS	4114052
FIELD OF DREAMS	9203062	IN COUNTRY	6436012
JANE FONDA: LIGHT AEROB. & STRESS REDUCTION	6432052	ROAD HOUSE	2875082
		WORKING GIRL	3722012

OVER 350 MOVIES

Now is the best time ever to really start building your movie collection! The Great 89¢ Movie Sale from CBS Video Club is here. So now, even with top hits like *The Ten Commandments* reduced from $79.95 to $19.95 and other new releases selling for even less, you cannot do better. You can own any six movies shown here for just 89¢ each (plus shipping and handling) when you join the CBS Video Club. And you can save up to $70 each on two more movies—see Advance Selections box in the coupon.

There's no membership fee for joining, nor do you have to buy a lot of movies. Just six more within the next three years. And you'll have no problem in finding six movies you want, because our library holds over 3,000 titles, from the very newest releases to classical favorites. Our regular Club prices currently range from $79.95 down to $29.95, plus shipping and handling; and we also offer a selection of specially priced videocassettes, down to $14.95. Your only membership obligation is to buy six movies within three years, for as little as $29.95 each—and you may cancel membership anytime after doing so.

How the Club operates: about every four weeks (up to 13 times a year) we send you our *CBS Video Club Magazine*, reviewing our Director's Selection, plus many alternate movies. And up to four times a year, you may also receive offers of Special Selections, usually at a discount

© 1990, CBS Records Inc.

Movie Sale

FOR JUST 89¢ EACH

plus shipping/handling with membership in the CBS Video Club. See details below.

plus two more for up to 85% off!

THE TEN COMMANDMENTS
2026062

DEAD POET'S SOCIETY
8506022

TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER
THE EMPIRE STRIKES BACK	0910412	PINK CADILLAC	6422072
COCKTAIL	5493032	PET SEMETARY	4479042

CASUALTIES OF WAR
5965022

MORE BLOCKBUSTERS

DIRTY DANCING	4955072
BACK TO THE FUTURE	2114092
STAR WARS	0564082
THE COLOR PURPLE	6301032
THE GODFATHER	0008022
PATTON	0043092
THREE MEN AND A BABY	5491052
TWINS	5810092
FATAL ATTRACTION	4393072
BEACHES	5498082
BIG	3674092

TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER
DANGEROUS LIAISONS	6387002	MR. DEEDS GOES TO TOWN	5948042
THE NAKED GUN	4471022	SUPERMAN THE MOVIE	0013392
COBRA	6201202	CAN'T BUY ME LOVE	5485032
FIRST BLOOD	6503172	D.O.A. (1988)	5489092
JAWS	1000242	CALLANETICS	2165152
THE RIGHT STUFF	6043142	HOLIDAY INN	1035152
MANNEQUIN	3439132	THE SERPENT AND THE RAINBOW	6819082
THE SEARCHERS	6102202	THE FLY (1986)	3617332
PALE RIDER	6097272	THE ROAD WARRIOR	6028392
ACTION JACKSON	5191082	THE BIG EASY	6559102
HAMBURGER HILL	4954082	THUNDERBALL	0709462
BRADDOCK: MISSING IN ACTION III	7250022	DR. NO	0554182
COMMANDO	3555372	THE COLOR OF MONEY	5470592
HEARTBREAK RIDGE	6289332	A SOLDIER'S STORY	1733282
RISKY BUSINESS	6033402	PRIME OF MISS JEAN BRODIE	3731002
A ROOM WITH A VIEW	3615012	YOU CAN'T TAKE IT WITH YOU	5949032
BABY BOOM	3656012		
NO WAY OUT	6558112		
SUSPECT	5911072		
THE TRIP TO BOUNTIFUL	3225292		
A CHORUS LINE	3193432		
TAP	5920062		
STARMAN	1723202		
THE RUNNING MAN	4956062		
THE PRINCIPAL	5908022		
HATARI	4110092		
NUTS	6328102		
A CRY IN THE DARK	6383042		
HEARTBREAK HOTEL	5497092		
CROSSING DELANCEY	6371082		
THE KILLING FIELDS	6084222		
COCOON II	3710052		
SCROOGED	4484072		
ARSENIC AND OLD LACE	0735442		

TITLE	SELECTION NUMBER	TITLE	SELECTION NUMBER
KICKBOXER	6742002	WOMEN ON THE VERGE OF A NERVOUS BREAKDOWN	2378002
KARATE KID III	5954052	EVERYBODY'S ALL AMERICAN	6380072
PORKY'S	0775602	TRADING PLACES	2017232
THE JOLSON STORY	1849032	PUNCHLINE	1994062
WANTED DEAD OR ALIVE	5601022	SHAKEDOWN	6821042
THE BOAT (DAS BOOT)	1520252	POLTERGEIST	2687142
THE MISSION	6303012	A STAR IS BORN (1954)	6105012
THE LIVING DAYLIGHTS	3652052	ANGEL HEART	7956172
CRITICAL CONDITION	4309182	SHE'S HAVING A BABY	4397032
HOOSIERS	6550192	SUPERMAN II	6015182
BELIEVERS	6554152	BROADCAST NEWS	3665002
A PASSAGE TO INDIA	1741362	FATAL BEAUTY	2785072
FRIENDLY PERSUASION	0960162	A NIGHTMARE ON ELM STREET III	3432102
10	0011312	THE MAN FROM SNOWY RIVER	0788082
ALEXANDER THE GREAT	2762042	AGNES OF GOD	1812222
POLTERGEIST III	2807012	BLADE RUNNER	3104332
MILAGRO BEANFIELD WAR	6809002	MURPHY'S ROMANCE	1853482
HAIRSPRAY	1975092	A NIGHTMARE ON ELM STREET II	3382022
PEE WEE'S BIG ADVENTURE	6098342	POLICE ACADEMY IV	6306162
BILL COSBY, HIMSELF	0935342	THE HANOI HILTON	6307072
NORTH BY NORTHWEST	2509362	SANTA CLAUS: THE MOVIE	3387232
BRUCE SPRINGSTEEN ANTHOLOGY (1978-1988)	4688012	BLACK WIDOW	3630022
STAND AND DELIVER	6337012	GOING MY WAY	1025092
TRUE BELIEVER	4092012	THE JAZZ SINGER (1980)	2069122
OUTRAGEOUS FORTUNE	5481072	THE COTTON CLUB	3100292
EXCALIBUR	6021022	PURPLE RAIN	6048012
HELLO AGAIN	5487012	BURGLAR	6309052
BILOXI BLUES	6822032	JAWS: THE REVENGE	2230082
PRINCE OF DARKNESS	2245012	DRAGNET	2227032
G.I. BLUES	0670332	SUPERMAN IV: THE QUEST FOR PEACE	6311012
CLOSE ENCOUNTERS OF THE THIRD KIND	1510272	THE GODFATHER PART II	0018592
		GOOD MORNING, VIETNAM	5482062

LAWRENCE OF ARABIA (RESTORED)
5919092

STAR TREK V
4486052

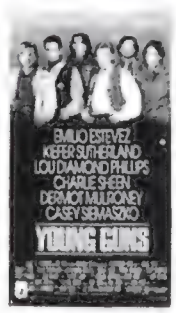
THE WIZARD OF OZ (ANNIVERSARY EDITION)
2941082

LETHAL WEAPON 2
6427022

BATMAN
6425042

WESTERNS/ACTION & ADVENTURE

DIE HARD	3676072
TEQUILA SUNRISE	6389082
RAIDERS OF THE LOST ARK	9108022
CROCODILE DUNDEE II	4415012
TOP GUN	4269082
THE DEAD POOL	6358052
THE MAGNIFICENT SEVEN	0534052
HIGH NOON	4016042
TRUE GRIT	2028042
ONCE UPON A TIME IN THE WEST	4217012
BUTCH CASSIDY & THE SUNDANCE KID	0517062



YOUNG GUNS
7266042

Available in VHS only.

TO CHOOSE FROM

off regular Club prices, for a total of up to 17 buying opportunities.

Choose only the movies you want: if you want the Director's Selection, don't do a thing–it'll arrive automatically. If you'd prefer an alternate movie, or none at all, just mail the card always provided by the date specified. You'll always have two full weeks to decide. (If you receive a tape before having had two weeks to decide, just send it back at our expense.)

Half-Price Bonus Plan: after fulfilling your membership obligation, you'll automatically become eligible for our Half-Price Bonus Plan. With each movie you buy at regular Club prices, the plan currently allows you to take another movie of equal value or less at 50% off.

10-Day Risk-Free Trial: join today and we'll send your introductory movies, along with more details on how the Club works. If for any reason you're not satisfied, return everything within 10 days for a full, prompt refund and no further obligation.

For fastest service: use your credit card and our toll-free number to order. Call 24-hours a day:

1-800-544-4431

CBS VIDEO CLUB
1400 No. Fruitridge Ave., Terre Haute, IN 47811-1112

CBS VIDEO CLUB Dept. JM3,
P.O. Box 1112, Terre Haute, IN 47811-1112

Yes, please enroll me under the terms outlined in this advertisement. As a member, I need buy just six more movies at regular Club prices within the next three years.

Send me these 6 movies for 89¢ each
plus $6.00 shipping and handling (a total of $11.34).
Available in VHS only.

#	#
#	#
#	#

Please check how paying: ☐ My check is enclosed. P75 P81 N22
☐ Charge my introductory movies and future Club purchases to:
☐ MasterCard ☐ Diners Club ☐ American Express ☐ VISA

Account # _____

Expiration Date _____ Signature _____

Name _____

Address _____ Apt. _____ City _____

State _____ Zip _____ Phone ( ) _____

Note: CBS Video Club reserves the right to reject any application or cancel any membership. Offer limited to continental U.S. (excluding Alaska) and Canada. Canadian residents will be serviced from Toronto (offer may vary). **Applicable sales tax added to all orders.** 224-F90

Advance Selections

SAVE UP TO $140 MORE– HAVE LESS TO BUY LATER!

You may order one or two more movies now for only $9.99 each–so you can save up to $140! What's more, each discount purchase immediately reduces your membership obligation by one!

☐ Also send my first selection for $9.99 plus $1.75 shipping/handling which I'm adding to my $11.34 payment (total $23.08). I then need buy only 5 more (instead of 6) in 3 years. #

☐ And also send still one more selection for an additional $9.99 plus $1.75 shipping/handling (total: $34.82). I then need buy only 4 more (instead of 6) in 3 years. #

P76 P82 N23

Luftwaffe's Heinkel 111 squadrons started crossing the English Channel on major air raids in July 1940.

By then, radar towers similar to these were in place up and down the British coast to detect the enemy.

By Fred Strebeigh

How England hung the 'curtain' that held Hitler at bay

As German bombers struck 50 years ago, Britain was ready with a newfangled system that became its first line of defense: radar

A few years before the outbreak of World War II, Britain realized that it had no adequate defense against Germany's fast-growing air force. Nazi bombs, it seemed, would soon set London ablaze. Located less than 30 miles from the sea, the city was the "greatest target in the world," said Winston Churchill, a "fat cow tied up to attract the beasts of prey." Speaking to the House of Commons in 1932, Stanley Baldwin, Britain's future prime minister, told his nation that it could not expect any protection: "I think it is well also for the man in the street to realize that there is no power on earth that can protect him from being bombed. Whatever people may tell him, *the bomber will always get through.*"

Not everyone agreed. Here and there creative thinkers—military and civilian, professional and amateur—began seeking ways to stop the bomber. Wild schemes emerged:

- Steel wires or nets, hung from balloons, could snag incoming planes;
- Clouds, somehow frozen solid, could provide platforms for mounting antiaircraft guns;

As network of radar stations sounds the alarm, British fighter pilots scramble to their Hurricanes.

Time and again during the Battle of Britain, early warnings gave the RAF the edge it desperately needed.

• British bombers, flying even higher than the enemy, could release swarms of mines that would float down on parachutes to explode in the faces of hostile pilots;
• "Death rays" using ultraviolet rays or x rays or radio waves could knock attackers from the sky;
• Massive sound locators, installed along the coast, could listen for the roar of bomber engines.

Exactly 50 years ago, as German planes began to sweep over England to prepare the way for a Nazi invasion, the survival of Britain—and thus the survival of any significant opposition to the forces of Adolf Hitler—hung on the evolution of one of those wild schemes. One of them had to stop the beasts of prey. And in fact one of them would become the early-warning system now referred to technically as Radio Detecting and Ranging but known almost universally by its acronym, RADAR.

As David E. Fisher explains in his excellent book *A Race on the Edge of Time*, Britain's Royal Air Force (RAF) had realized for a long time that it needed to find something that could work. By 1934, the British knew that Hitler was building up Germany's air force, the Luftwaffe, aiming for 4,000 bombers—presumably capable of overwhelming the RAF's 330 fighter planes. That summer, the RAF staged a trial of its fighters' ability to intercept attacking bombers. They failed miserably. Although many of the mock attackers flew far more slowly than any Luftwaffe bomber would, most of them cruised to their targets without encountering any opposition. The RAF pilots simply could not find incoming bombers in the vast sky.

Soon after that embarrassment, the RAF officer in charge of research and development, Air Marshal Sir Hugh (Stuffy) Dowding, traveled to an air base south of London for a demonstration of the scheme that seemed to offer Britain's best hope: a huge concrete sound locator. He saw a curved wall 200 feet long by 25 feet high and studded with microphones. Britain's Air Ministry intended to build similar listening devices along the headlands and beaches east of London in the hopes of detecting the thrum of oncoming bombers as early as possible.

Shortly before the demonstration was scheduled to begin, a milkman appeared, driving his horse and cart,

Do your heels ache?

Why suffer another day with sore heels (**and even heel spur aches**) when **Cushi-Heel Pillow** gives you quick relief **while you walk or run?** Developed by an athlete, who suffered just as you do, and who couldn't find anything which helped. His U.S. patented (No. 3,984,926) pads are exactly the right shape, density and compression to cushion the weight your heels must bear. Mailmen, housewives, waitresses, sales people, nurses, bartenders, school teachers, people who *must* be on their feet all swear by them. Joggers, tennis, golf, basketball and racquetball players find they can now play in comfort even with **heel spur** problems. **If not satisfied, return within 10 days for full and prompt refund.**

Calderon Products, Inc.
117 Fairlawn Plaza Drive, Dept. S2
P.O. Box 5387, Akron, OH 44313•(216) 864-8100

☐ One pair Cushi Heel Pillows **$7.50** p.pd.
☐ Save! Two pairs for only **$13.00** p.pd.
☐ Save more! Three pairs for only **$17.25** p.pd.

Fast delivery! Shipped by First Class Mail.

Enclosed: ☐ check ☐ money order ☐ cash
Visa–MasterCard holders (TO ORDER ONLY)
Call Toll Free 1-800-824-7888, Operator 941
24 hrs. a day, 7 days a week.
Ohio residents add 5½% sales tax.

Specify shoe size:
Men's shoe size _____ Women's shoe size _____
Name _____
Address _____
City _____
State _____ Zip _____

Farm Fresh California Almonds

Nature's Snackfood!

Buy Directly From the Grower and SAVE!! **$1.99** Per Pound

Buy your Natural California Almonds directly from our ranch in the sun-drenched San Joaquin Valley. Picked fresh from the tree, shelled, sorted, then shipped directly to you or your friends as gifts. And, ideal as an ingredient in recipes. Choose from three convenient sizes.

You can't lose with our 30-Day Money Back Guarantee.

Mail to: P-R Farms, Inc. **E**
2929 E. Copper, Clovis, CA 93612
Send me these Natural Almond packs:
___10 lbs. @ $19.90 (plus $7 shipping)
___5 lbs. @ $14.50 (plus $4 shipping)
___25 lbs. @ $45.50 (plus $14 shipping)
Alaska/Hawaii add 30% to shipping
Payment Enclosed:
___ check _____money order
Name _____
Address _____
City _____
State _____ Zip _____
Phone _____

Robert Watson Watt was the driving force behind team that invented radar.

his milk cans clanking away. The would-be defenders of Britain rushed off and reprimanded the noisy intruder, who fell silent. But Dowding was no fool. The Luftwaffe, he knew, would not agree to attack only in Britain's quiet moments.

The sound locator failure gave new life to an old, wild scheme—a "death ray" to knock pilots and planes from the sky. As early as 1916, a British commander in chief had watched while an inventor zapped two rabbits with his new ray. After a few minutes the rabbits died, but only because they had been poisoned. Later, other inventors claimed their rays could knock off mice or pigeons. In early 1935 the Air Ministry requested a new death ray evaluation from the superintendent of the nation's Radio Research Station, a mercurial Scot named Robert Watson Watt. Could radio waves, the ministry wondered, be transmitted with enough power to knock out enemy pilots?

In Watson Watt, a physicist, Britain's defense problem had found its man. Irreverent, chubby, clubby and, perhaps most important, intolerant of the "drab scum of routine," Watson Watt apparently saw himself as a salesman of ideas awaiting his one great marketing opportunity. Alas for him, the death ray question presented itself as, fundamentally, a problem in mathematics—perhaps his worst subject. To give his destiny and his math a boost, he turned to one of his most skilled assistants, Arnold (Skip) Wilkins, also a physicist. Without explaining his purpose, Watson Watt posed an odd problem: imagine that eight pints of water at 98 degrees Fahrenheit is suspended five kilometers away and one kilometer high. To raise that water's temperature to 105 degrees, how much radio power would you have to transmit toward it?

Wilkins quickly decoded the question. Eight pints of water at 98 degrees Fahrenheit equals, more or less, a human being. A human being suspended one kilometer in the air is probably a pilot. A pilot whose blood temperature rises suddenly to 105 de-

Air Marshal Hugh Dowding (right) takes the king on tour of command center.

Bawdsey Manor, a sprawling red-brick pile on the Suffolk coast, became Watson Watt's radar research center in 1936.

grees is unsafe at any speed. Watson Watt was asking for the power demands of a death ray.

Those demands, Wilkins' math showed, could not be met, but out of that abortive collaboration emerged the seeds of a new scheme that resulted in what is now called radar. Its paternity remains in dispute even today, but Watson Watt reveled in calling himself the father of radar. On February 12, 1935, he submitted the draft of a rather technical memo to Britain's new Committee for the Scientific Survey of Air Defence. He urged that Britain use radio to ring its shores with "an invisible curtain" (as Watson Watt would put it years later, rephrasing his own memo for added glamour). The curtain would be erected by a series of radio transmitters that would generate "loud, short, sharp radio bangs." A series of receiving devices would listen for echoes and count the millionths of a second between bang and echo. Each ten-millionths of a second represented roughly a mile. A plane's distance in miles could thus be displayed on the glowing screen of a cathode-ray tube.

With a bit more calculating, the echoes could also give clues to a plane's direction and height. A friendly plane could even carry a device that would respond to its own nation's radar bangs—automatically sending back, along with the echo, a signal allowing radar operators to distinguish friend from foe.

On paper, radar sounded ready to guard Britain. The committee asked for military seed money. Its request stopped with Stuffy Dowding—still in charge of RAF research. After the fiasco of the concrete sound locators, he was skeptical about wild schemers. Wars aren't fought with math on scraps of paper, Dowding declared. He wanted a demonstration, fast.

Handed another tough problem, Watson Watt again turned to the indispensable Wilkins. Without money, he asked, how could a nonexistent system be prepared for an almost-immediate test?

Wilkins swiftly located a British Broadcasting Corporation transmitter in Northamptonshire that sent the

The author teaches writing at Yale. He wrote about Sherlock Holmes for SMITHSONIAN *in December 1986.*

SAUNDERS & COOKE

Tradition and Quality

STICK BAROMETERS

Handcrafted in the manner of the 18th century.

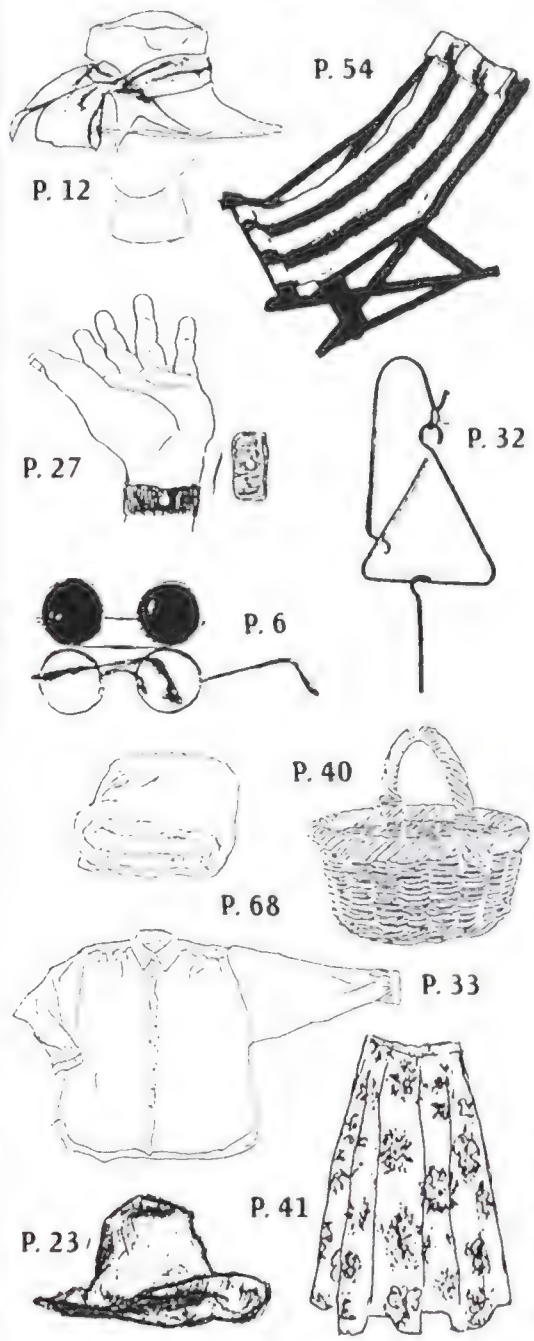
A PERFECT GIFT

Send $2. for color brochure.
Prices from $425.

SAUNDERS and COOKE
Box 1459, Portsmouth , NH 03801

Ht: 40"

The J. Peterman Catalogue. (No. 6) Summer '90.



© 1990 The J. Peterman Company

Catalogue to _____
name

_____
address

_____
city state zip

The J. Peterman Company
2444 Palumbo Drive
Lexington, Kentucky 40509
(800) 231-7341

S7

MUSEUM REPLICAS

MASK OF AGAMEMNON c.1550 BC. Discovered by Schliemann in the Sacred Grave Circle at Mycenae. Nat. Mus. Athens 12" H Anodized gold/black felt backing. $62.00 ppd. Call 800-262-4382 or 714-768-0353. Visa, MC, AMEX, CK. CA add 6.25% tax. Large selection of museum replicas. Send $6.00 for Catalogue/Guide–refundable w/first order. Satisfaction guaranteed.

WORLD TREASURES
23016-A Del Lago Dr., Dept. SMII, Laguna Hills CA 92653

LEATHER BACKPACK RUGGED ONLY $29.95

HISTORIC EXPLORERS of America required backpacks that were tough! Now **YOU** can enjoy the richness (smell that leather) and durability of soft, 100% leather in this modern version of the famous trail pack of yesteryear. Rich tan color. Black metal hardware. Roomy 14" x 17" x 6" cargo compartment plus 3 handy expandable outside pockets. Two 2" wide adjustable shoulder straps. Excellant bookbag. Offers 1,000 uses for any outdoorsman and a touch of class for those "long hours on the trail." Send $29.95 + $3.95 delivery. Use 30 days, money back if not pleased. MasterCard & Visa accepted (phone 312-445-6166). C.O.D. require $5 deposit. Order today! Midwest Company, Dept. L 2019, 9043 S. Western Ave. Chicago, Ill. 60620. Special 2 packs for $58.90 postpaid. Our 54th year.

BONUS: ORDER NOW
RECEIVE A COMPASS FREE

Mothers Work© Maternity
Dresses For Success

Executive suits, elegant dresses, contemporary sportswear, and evening dresses too! For a great image during and after pregnancy. **Catalog** with swatches and fit guide $3, refundable with order.

Visit our stores in: Atlanta, Arlington Hts., IL, Baltimore, Boston, Charlotte, NC, Chicago, Cleveland, Dallas, Denver, Fair Oaks Mall, VA, Ft. Lauderdale, Harrisburg, PA, Hartford, CT, Houston, King of Prussia, PA, Los Angeles, Memphis, TN, Minneapolis, New Orleans, New York, Palo Alto, CA, Philadelphia, Pittsburgh, Princeton, N.J., Rochester, MN, St. Louis, San Francisco, Orange County, CA, Stamford, CT, Washington, D.C. Phone 215-625-0151. 1309 Noble Street, 5th Floor, Dept. SN0G, Philadelphia, PA 19123.

HANDCRAFTED PEWTER SCULPTED BY NATIONALLY RENOWNED COLORADO ARTIST, MICHAEL ANTHONY RICKER. CHOOSE FROM WESTERN SCENES, WILDLIFE, SPORTS, MYTHOLOGY, CATS, DOGS & MORE

Send $2.50 for catalog *(refundable with first order)*
CALL TOLL-FREE 1-800-28GRECO
Greco COLLECTIBLES
P.O. Box 14265, Dept. S
2760-R S. Havana St.
Aurora, CO 80014

KOALA PENDANT

Sterling—$45; 14K—$275
18" neckchain is included
Satisfaction guaranteed

Vern Wayne Pond
609 E. Market St., #103
Charlottesville, VA 22901

VISA/MC/AMEX 1-800-284-8376

kind of radio waves that he hoped would create good echoes. He gathered some receiving gear he hoped would work. On the day before the crucial test, he loaded the gear into an old Morris van, drove to a farmer's field not far from the transmitter, and started setting up aerials and batteries and cathode-ray equipment. Night fell. To prepare the receiver, he needed to tune it to the BBC radio waves, which would cut off at midnight. He had no light; his assistant began striking matches. Wilkins worked to connect wire after wire. The night turned cold and froze the mud beneath them. By midnight, the work was done.

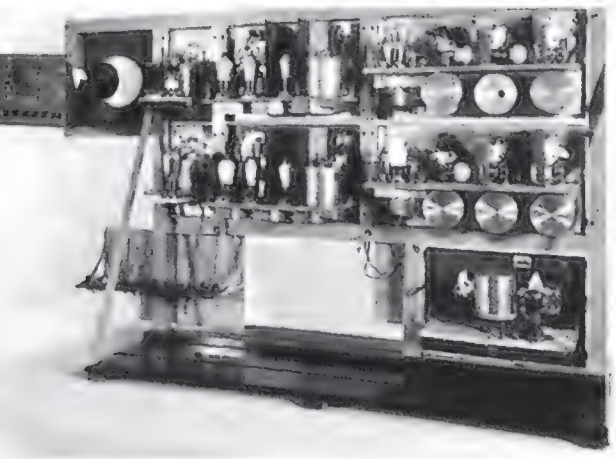
The next morning, February 26, Watson Watt arrived for the test, driving his elegant Daimler. He brought an observer from the Air Ministry and his own nephew, who had come along for the ride. As planned, an RAF bomber flew overhead. The BBC radio waves, bouncing off the bomber, allowed Wilkins' receiver to follow the bomber for about eight miles.

Watson Watt and the Air Ministry observer said almost nothing. They just left Wilkins to pack up, jumped in the Daimler and dashed for London. But apparently they were thrilled quite out of their minds: after several miles spent predicting radar's rosy future, they abruptly realized they had abandoned Watson Watt's young nephew to wander in the mud of an empty field. They sped back to get him. The next day, Stuffy Dowding authorized £10,000 for the top-secret creation of radar.

With this relatively modest sum, Watson Watt and Wilkins began what they believed was a race against time. They aimed for success by 1938, when Watson Watt predicted war with Germany. What neither of them seemed to realize is that they were racing not just against time but also against many other nations. A year earlier, for example, Russian radar had detected airplanes almost two miles away, and French radar had detected planes three miles high. Italy and America had also begun radar work. But the worst news for the British, had they known it, would have come from Germany.

German radar had a long history. In 1904, a German inventor had demonstrated a radio obstacle-detector to help navigate ships through fog; the

During the 1940 air offensive, Luftwaffe chief Hermann Göring (sixth from right) and his numerous staff gaze across Channel.



Watson Watt's receiver was used in 1935 to test feasibility of radar detection.

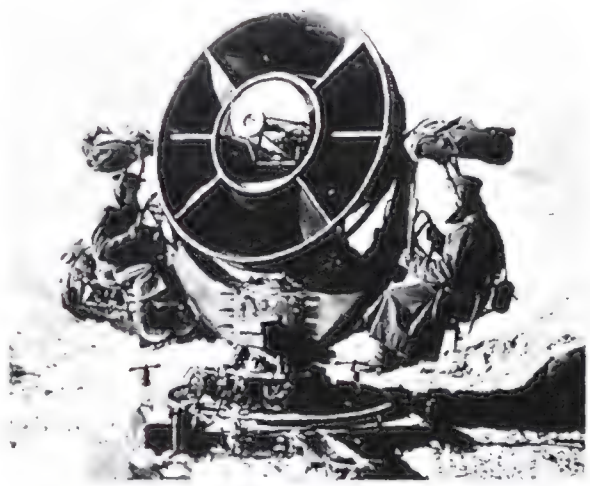
German Navy had shown no interest. Later, in 1916, with their nation at war, two Germans proposed a radio target-detector to help aim guns at night; they said they could have it ready in six months. The navy replied: too late, because the war would not last so long. Finally, in 1933, the German military awoke to radar. A year later, its navy had demonstrated a device that could detect a ship at seven miles and a plane at almost half a mile, and the government had authorized further development.

By the time Watson Watt and his radar team entered the race, they were already far behind. For their secret mission, they needed a secret site. Watson Watt chose perhaps the most forbidding research station in England, a remote gravel spit known as Orfordness. Its low and flinty strand divided barren Suffolk marshes from the harsh North Sea. Reached by ferry across a tidal river that had taken many lives, blown over by hail and sleet, Orfordness offered its crew a life of hardship.

The easy-living Watson Watt did not assume management of the hard-scrabble site. Instead, he entrusted Orfordness to the man who was all that he was not—the man who was granite to his mercury, patience to his impatience, sinew to his flab, quiet to his noise—the unflappable Skip Wilkins. At Orfordness, Wilkins quickly set to work with a small team—half a dozen, all told. Watson Watt blew in on weekends to stay at a nearby inn. There he impressed his team with the imminence of Armageddon, telling them that "every week that passes is 1 percent of the time that we are entitled to count our own." There also he entertained guests, to whom he sometimes exaggerated what his team had accomplished. For him, Orfordness was a place where "a small group of young men, led by one not so young"—himself, of course—"lived and breathed their enterprise, and they talked about it at breakfast, at lunch, at dinner, in the boat crossing to the Island and in the hotel sitting-room, until it was time to go to bed."

Racing to overtake Watson Watt's exaggerations, the team made dramatic progress. Soon they were tracking airplanes at distances of 40 and then 80 miles offshore. Near the end of 1935, responding to those successes, the British Treasury allocated £1 million to create five radar stations along the coast east of London. And then, as if to give the radar team a token of its esteem, for a mere £24,000 the Treasury bought them a new home.

Headquarters became Bawdsey Manor, the grand estate of a retrenching aristocrat named Sir W. Cuthbert Quilter. Just south of Orfordness, Bawdsey perched atop impressive cliffs. Set among formal gardens, stables and sports fields, it had a fruitery of lemons and a lily pond full of goldfish. It overlooked a fine beach and



Wearing earphones, German soldiers man listening device to detect planes.

Want to brush up on a foreign language?

With Audio-Forum's intermediate and advanced materials, it's easy to maintain and sharpen your foreign-language skills.

Besides intermediate and advanced audio-cassette courses—most developed for the U.S. State Dept.—we offer foreign-language mystery dramas, dialogs recorded in Paris, games, music, and many other helpful materials. And if you want to learn a *new* language, we have beginning courses for adults and for children.

We offer introductory and advanced materials in most of the world's languages: French, German, Spanish, Italian, Japanese, Mandarin, Greek, Russian, Portuguese, Korean, Norwegian, Swedish, and many others.

Call 1-800-243-1234 for FREE 32-p. catalog, or write:

AUDIO-FORUM®

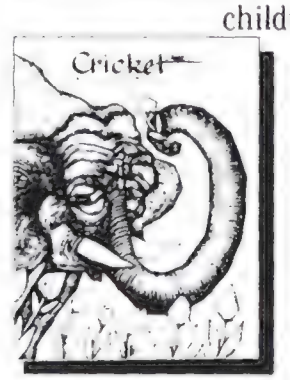
Room M705, 96 Broad Street,
Guilford, CT 06437 (203) 453-9794

Cricket

the magazine for children

. . . is for very special children who are curious about their world, who love to read, who have adventurous minds and active imaginations . . .

children just like yours!



"A fine literary magazine for children, this monthly has no living peers Unfortunate, indeed, are those who pass through the years of 6 to 12 unacquainted with CRICKET."
–BOOKLIST

$14.95 for an EIGHT-ISSUE TRIAL subscription. Send no money. We will bill you later. *Save over $15.00 off the regular twelve-issue price!* Order now by calling toll free or by sending us the coupon below.

Name _____

Address _____

_____

City, State, Zip _____

1-800-BUG PALS (1-800-284-7257)
CRICKET, Box 52933, Boulder, CO 80322

5SMS3

Luftwaffe officers plan a bombing raid by studying map of an English port.

German photograph suggests London was at mercy of Nazi bombers. Churchill himself likened the vulnerable city to a "fat cow."

a river mouth guarded by towers left from the Napoleonic Wars. The house itself held great chambers of high windows, tooled leather, molded plaster and carved oak.

The radar team moved only ten miles, but from one of England's roughest research stations to its most seductive. Even Watson Watt, quitting his job as head of the Radio Research Station, moved to Bawdsey Manor. There radar's young men swam in the sea at midday and worked in labs until midnight, or staged evening cricket matches on the manor's lawn and adjourned to technical debates before a roaring fire in a great timbered hall. They had entered radar heaven.

To fill the manor, Watson Watt scoured British universities for brilliant young scientists. They could be ignorant of radio, he believed, for they would learn. Some recruits understood radio so little that an amateur radio manual became their main reference book. But soon these amateurs faced professional tests.

The Bawdsey spirit found its epitome in an enthusiastic young Welshman, E. G. (Taffy) Bowen, who had been working on a doctorate in physics before joining the team and whom Watson Watt liked to portray as a Celtic brigand. Bowen now took responsibility for squeezing radar gear from the size of a room into the size of a two-foot-square box that could be jammed into an airplane. Always smiling and often nearly electrocuting himself, the 24-year-old Bowen set about single-handedly creating the first airborne radar equipment.

Late in the summer of 1937, Bowen, always an eager sportsman, got word of a game he could not resist—some military hide-and-seek. A flotilla of ships from the Royal Navy would slip into the North Sea, and then Royal Air Force squadrons would fly off looking for them. Watson Watt urged Bowen, as a civilian brigand, to fly out in his radar-equipped plane and play the game.

On the contest's opening morning, Bowen and two of his Bawdsey team members had their plane aloft at dawn. The weather turned perfect for hiding the navy—all cloud and fog. Bowen's team flew on unconcerned, eyes on their newly created radar screen. At about 8 A.M., they picked up large echoes five miles away and then cruised over the Royal Navy fleet. The navy, in response, unleashed a barrage of antiaircraft blanks. At the same time, it scrambled all the fighter planes off the deck of the aircraft carrier *Courageous*—whereupon Bowen's triumphant crew saw, for the first time, that airborne radar could indeed detect approaching planes.

They turned away from the onrushing fighters and soon, realizing their plane was flying with little fuel and no visibility, headed for home through the fog. As expected, the coast appeared on their radar screens, and they landed to report success.

When Bowen called his report to the Air Ministry, the wing commander in charge confirmed that a lone aircraft had indeed intercepted the fleet

precisely as Bowen claimed. But, the commander wanted to know, what RAF squadron was taking credit? Just two civilians and their pilot, Bowen told him. The stunned commander then delivered his own surprise. Because of foul weather, at 8 A.M. the entire exercise had been canceled—grounding all RAF aircraft.

Bowen's team, in a stroke, had shown the RAF and the Royal Navy the promise of radar: it could be carried by craft as small as an airplane; it could detect enemy boats and planes when nothing else could; it could permit navigation in otherwise-impossible weather. Bowen's success also showed that Bawdsey was achieving a peculiarly British ideal: the spirited amateur triumphing over hardened professionals (in this case, military). Victory in the future battles of Europe, it seemed, was being prepared on the playing fields not of Eton but of Bawdsey Manor.

And then, on September 1, 1939, Germany invaded Poland. Britain responded by entering World War II. British radar still had major flaws. Ground-based radar stations could not tell, for example, if a plane was in front or in back of them. Airborne radar sets, suffering worse problems, had been installed in only six fighters. Most of the flaws could be fixed, but months were needed.

Adolf Hitler, to Britain's surprise, provided those months. Through the end of 1939 and into the summer of 1940, Germany rolled into Poland and Denmark and Norway and Holland and Belgium and finally France, but did not send any significant force against England. As Europe fell, the RAF lost hundreds of planes in hopeless sacrifice above the fields of France. Winston Churchill, as prime minister, pushed to send more. But Stuffy Dowding managed to hold them back. The man who had bet Britain's first £10,000 on radar, now the most senior officer in the RAF and the commander in chief of its Fighter Command, Dowding saw that his outnumbered planes had no chance over Europe. But he prayed that radar's invisible curtain might work well enough to give his planes an edge in the skies above England.

While Dowding prayed for his radar, he must have wondered what the Germans were doing with theirs. They had not, after all, been modest about it. Two years before war began, a German general had announced to RAF officers that the Luftwaffe, too, was working on radar, "and we think we are ahead of you." To the RAF, that meant Germany had penetrated what Britain once hoped was its private radar secret. With secrecy lost, British radar would be terribly vulnerable. German bombers needed only to hit Britain's exposed coastal radar stations, it seemed, and the radar curtain would fall in tatters.

Britain's months for unmolested tinkering with radar ended finally in July 1940. Directed by Field Marshal Hermann Göring, the Luftwaffe began what Winston Churchill called "the Battle of Britain"—the fight for Britain's survival. Göring had 1,500 bombers and 1,000 superb fighters to provide escort, many of them based within 30 miles of Britain. Dowding had about 700 RAF fighters with which to make his defense.

Göring's plan was simple. His bombers would lure forth large numbers of RAF defenders. His fighters would gun them down. Once the RAF had been destroyed, Göring's planes could

Technician at an RAF radar station (above) radios positions of planes to workers at headquarters (right), who locate them with markers on a map.

Helmeted British troops march off two German fliers after their bomber was shot down by radar-assisted fighters.

bomb any Royal Navy ship that entered the no-longer-British Channel. And once that narrow strip of water no longer divided Germany's army from Britain's coast, Germany could invade and, said Hitler, "occupy the country completely." He scheduled the invasion for September 1940.

Meanwhile Dowding kept praying that radar would work well enough—and survive long enough—to save Britain. Without it, he would need to keep large numbers of fighters patrolling aloft. Without radar his pilots would spend crucial time growing tired and wasting fuel before locating an incoming raid. Without radar his defense would be scattered and weakened. Dowding counted on radar to make all that unnecessary.

By the start of the Battle of Britain, a chain of 29 Bawdsey-designed radar stations, sprouting lattices of steel or wood that rose as high as 360 feet into the air, stretched round the British southern and eastern coasts from Land's End in Cornwall to the Orkney Islands of Scotland. All were linked, or soon would be, by specially laid underground cables to Dowding's headquarters just north of London. There, also underground, sat a vast map of the English Channel and its adjoining coasts. When Göring's planes took off from a field in France or Belgium or Holland, wooden markers appeared on the map and were then pushed along the Luftwaffe flight paths by members of the Women's Auxiliary Air Force, who used plotting rods modeled on croupier's rakes found in gambling casinos.

Using information from the radar map, Dowding's commanders at RAF bases around the country could send off their fighters not in scattershot swarms but as small flights like rifle shots. As each RAF flight rushed into the air, markers carrying flags appeared on the map and moved to meet the unflagged Luftwaffe markers. Directed by radio calls from ground controllers, RAF fighters raced to intercept the Luftwaffe at precise points in the sky. Almost wherever they flew, Göring's bombers and fighters met tight packs of British Spitfires and Hurricanes, flown by fresh pilots with ample fuel and blazing guns.

And Göring apparently thought it was luck. Although Germany had entered the war with radar sets as good as Britain's, it had not bothered to create a *system* utilizing communication webs and map rooms. Göring knew the coastal towers were intended for radio detection of aircraft, but he could not imagine how the British system worked, if it really worked at all. The radar secret was, so to speak, safe with him.

In the first five weeks of the Battle of Britain, the "lucky" RAF outshot the Luftwaffe day after day, losing 128 planes but destroying 255 by August 12. Finally, pressured by his associates, Göring ordered one concentrated attack on Britain's radar stations. His bombs hardly damaged the latticed towers—only a direct hit would have worked—but they severed wires and shattered huts and put five crucial stations out of order, creating vast gaps for the Luftwaffe.

Göring never found out. Dowding and his aides had long been prepared for such a crisis. Within hours, they rushed four stations back into opera-

Göring debriefs Luftwaffe pilot who made it back after a raid on England.

Inspiring symbol of British defiance, Churchill inspects tommy gun in 1940.

tion and kept the radar curtain nearly intact. The next day, British "luck" continued: the RAF lost 13 fighters, the Luftwaffe 45. Two days later the RAF lost 34, the Luftwaffe 75. As his losses mounted, Göring decided that the radar stations were not just inconsequential, as he had always believed—they were indestructible. "Not one of those attacked," he incorrectly informed his commanders, "has been put out of action." He ordered German pilots to leave the radar stations alone, except in unusual circumstances. In the next month the Luftwaffe lost plane after plane, and by mid-October Germany had lost all chance of invading Britain.

As Fisher points out in *A Race on the Edge of Time*, British radar evolved at the only moment in which it could have saved Britain from invasion. Had it arrived a bit later, German bombers would have overwhelmed Britain. But had it arrived a bit earlier, German strategists might have recognized its importance and destroyed radar's frail towers.

Although the Battle of Britain officially ended in late October 1940, radar's role in World War II had only begun. Soon, because of the work of Bowen and many others, radar sets moved into the air. Carried in the noses of planes, they played a crucial role in intercepting German night bombers and in combating German submarines.

For all that it contributed to Allied victory, one of the greatest testaments to radar came in defeat—at a place called Pearl Harbor. By early December 1941, the United States had built five radar stations of its own design in Hawaii and had created a central monitoring base near Pearl Harbor. Unfortunately, the base had no effective system: no method to distinguish between hostile and friendly blips, for example, and no communications adequate to direct intercepting planes. Also, it had instructed its five stations to go on duty each day only from 4 A.M. to 7 A.M.—for no clear reason except perhaps the theory that no enemy would attack after breakfast. Like the German command, it seemed American officers in Hawaii did not take radar seriously.

Just before 7 A.M. on December 7, a few stations reported echoes more than a hundred miles off, and then all but one dutifully shut down. At that lone station, however, one young Signal Corps private had persuaded another private to give him radar lessons. At a few minutes past 7, their radar screen suddenly flashed the biggest blip they had ever seen, apparently a formation of more than a hundred planes.

The privates called the monitoring base to alert the lieutenant on duty. The lieutenant did not know what to do. He told the privates, "Don't worry about it."

Still the privates kept putting dots on their chart. They traced a massive flight of planes, cruising toward them from 132 miles north of Oahu at 7:02 A.M. to 20 miles at 7:39 A.M. (when the limitations of their gear made them lose track). At about 8 A.M. on December 7, 1941, his day's work complete, the young lieutenant who did not know what to do stepped out of his monitoring base and looked up at Pearl Harbor's sunny sky. It was full of Japanese bombers. Eight days later, Pearl Harbor had an effective radar system.

Graceful contrails trace the course of deadly action as fighters and bombers mix it up high above London during a predawn raid.

CHALLENGE THEM
Kindergarten through 8th Grade

You can bring a classic, comprehensive home instruction program to your child. Your home is your classroom; you are the teacher. Developed by certified teachers at our outstanding independent school with detailed, step-by-step instructions. No teaching experience required. All materials are included and you may begin at any time. Coursework readily accepted by other schools; transcripts provided. Assistance from our certified Advisory Teachers is optional. Ideal for enrichment. Join over 350,000 student users since 1906. Fully accredited. Non-profit. Write, call, or FAX for free information.

CALVERT SCHOOL
(301)243-6030 FAX(301)366-0674
Dept. S7, Tuscany Road, Baltimore, MD 21210

PERSONALIZED CARTOUCHE

Your name or initials translated into ancient Egyptian Heiroglyphics

18k Gold Pendant from $150
Sterling Silver $40
1-800-237-3358
Discoveries
297 Ramsay Alley, Alexandria, VA
(703) 548-9448 (in VA) 22314

Free Brochure Available
Cartouche shown: "Jane"

HANDMADE IN EGYPT

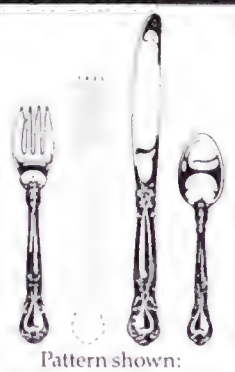
Silver Broccoli Pin

Newport Silversmith James Breakell cooks up a deliciously detailed stalk to pin on lapel or apron. Hand cast in sterling $35 or 14K gold $376. Add $3.50 shipping.
VISA/MC/AMEX 1-800-767-6411.
Send $2 for color catalog.

J.H. Breakell & Co.
69 Mill Street, Dept. SMBR8
Newport, RI 02840

MISSING A PIECE OF YOUR PATTERN?

Now you can replace pieces or add to your sterling silver collection at up to 75% off retail prices. We specialize in new and used flatware and holloware, with over a thousand patterns in stock. Call or write for a free inventory of your sterling. *(We also buy sterling, with a careful appraisal for maximum value.)*



Pattern shown:
Chantilly by Gorham

Beverly Bremer
SILVER SHOP
3164 Peachtree Rd. NE, Dept. SM
Phone (404) 261-4009
Atlanta, GA 30305
Hours 10-5, Mon.-Sat.

AUDIO BOOKS
RENT OR PURCHASE TODAY'S BEST SELLING BOOKS ON TAPE (starting at $2.50)
Call for a FREE Catalog
1-800-628-6145
Audio Diversions
306 Commerce St., Occoquan, Va. 22125

Book reviews

The Brideshead Generation: Evelyn Waugh and His Friends
Humphrey Carpenter
Houghton Mifflin, $27.95

British novelist Evelyn Waugh describes his daily routine not long before his death in 1966: "I get up late. I try to read my letters. I try to read the paper. I have some gin. I try to read the paper again. I have some more gin. . . . That's my life."

Suffering intense boredom, the author of such brilliant bitter comedies as *Decline and Fall, Vile Bodies* and *Scoop* sometimes spent the morning breathing on his library window and playing tic-tac-toe against himself, sipping gin between games. In earlier years he used to fight off depression by going out to work on a stone wall he called The Edifice. "When this was finished," notes Humphrey Carpenter, "he advertised for human skulls to adorn it, and received a large number."

Such anecdotes about Waugh abound, and most of the good ones find a place in this relaxed, carpet-slippers-and-port kind of book. Neither an academic study nor an official life, *The Brideshead Generation* should instead be appreciated as an immensely diverting literary entertainment. Carpenter, a sprightly professional biographer, expertly mines numerous memoirs, diaries and critical studies to create a group portrait of the British literary generation that came of age between the two world wars. Mostly, this was a chummy men's club of Oxford grads; its best-known members included Waugh, Graham Greene, Anthony Powell, Cyril Connolly, Harold Acton and John Betjeman.

Stuffier books might, say, deconstruct Powell's *A Dance to the Music of Time*, but this one zeroes in on social detail, period flavor, gossip. Carpenter re-creates the parties of the Bright Young Things, the goings-on at Rosa Lewis' notorious Cavendish Hotel, the menus for the Oxford University Railway Club. He even explains the social hierarchy of Oxford colleges—Balliol for intellectuals but Christ Church for Old Etonians. Unexpected facts abound: John Betjeman was briefly taught at school by T. S. Eliot and was tutored at university by C. S. Lewis, went to bed with W. H. Auden, and carried a teddy bear named Archie everywhere. Archie eventually found his apotheosis as Aloysius, the cuddly companion of the doomed Sebastian Flyte in Waugh's *Brideshead Revisited*.

For most of these young men Oxford proved to be the central event in their lives. There Waugh joined the Hypocrites Club ("Gentlemen may prance but not dance"), flirted with homosexuality and exercised his flair for the macabre. For instance, Waugh and his friend Terrence Greenidge decided that a certain don must wish to violate dogs sexually, and once went so far as to set a stuffed dog near the poor man's rooms "as an allurement." Waugh even took to barking outside his victim's window.

This same cruel humor made for Waugh's early success as a novelist: in the conclusion to *Black Mischief* Basil Seal, captured by cannibals, unknowingly devours his girlfriend; and in the final chapter of *A Handful of Dust* its victim-hero is forced to spend the rest of his life in the jungle reading Dickens aloud to a madman. Happily, Waugh never lost his gothic ingenuity. Much later, playing charades with his children, he instructed them to mime the deathbed scene of a crony of his.

Besides chronicling such fun and games, Carpenter periodically steps to the lectern to discuss themes from the work of all these esthetes and eccentrics: ambiguous feelings about fathers; the country house as an arcadian ideal; a recurrent sense of futility; scorn for the modern world and the middle classes. On average, Carpenter favors the early books of his subjects, rating highly even Cyril Connolly's well-written but lifeless short novel *The Rock Pool*. He also tends to interpret, even overinterpret, fiction in biographical terms: for instance, the whiskey priest of *The Power and the Glory*, he says, is Graham

Greene himself. Waugh, speculates Carpenter, seemed to reject but actually emulated his Edwardian father, suffered from deep-seated sibling rivalry, and may even have felt a bat's squeak of incestuous desire for one of his daughters.

The only serious complaint to be lodged against *The Brideshead Generation* is that it focuses principally on the major, already-familiar figures, and a little too much on Waugh himself, the subject of two mammoth biographies. I kept hoping to learn more about Edward James, the richest student at Oxford and "widely believed to be" the illegitimate offspring of King Edward VII. About the rakish, drunken Alfred Duggan, who eventually gave up the bottle to become a historical novelist. And about Robert Byron, whose *The Road to Oxiana* has been called the *Waste Land* of travel books. Most of all, I wanted to know more about Richard Pares, the only one of this circle to earn a first-class degree and named by Isaiah Berlin as "the best and most admirable man I have ever known." It is a measure of the charm of *The Brideshead Generation* that even at the end of a long, entertaining book one can yearn for yet another about its lesser lights.

Michael Dirda
Writer and editor
Washington Post Book World

A Year at Monticello: 1795
Donald Jackson
Fulcrum, $17.95

Wrote Thomas Jefferson in 1784, in *Notes on the State of Virginia*: "Those who labour in the earth are the chosen people of God, if he ever had a chosen people, whose breasts he has made his peculiar deposit for substantial and genuine virtue."

To students of American history, it's no secret that Jefferson long envisioned an agrarian republic patchworked together by virtuous planters like himself. His rhetoric on the subject is indelibly lofty. But when Jefferson brought himself—quite literally—to earth, what sort of farmer was he? More important, how could one man both "labour in the earth" and play a decisive role in keeping the fragile republic on course?

In *A Year at Monticello*, the late historian Donald Jackson addresses these questions by examining one of the rare years that Jefferson spent at Monticello between 1784, when he became minister plenipotentiary to France, and 1809, when he retired from the Presidency. Jackson is well-equipped for the task: an authority on the history of Western exploration as well as a Jefferson scholar, he grew up on an Iowa farm, and richly evokes the rhythms of a working farm and Jefferson's love for the land.

Jackson's point of departure in this slender volume is his refusal to take written history at face value. He notes, for example, that Sarah N. Randolph, Jefferson's great-granddaughter and family biographer, found "nothing worthy of notice in Jefferson's life during the year 1795." For Jackson, by contrast, the year in which Jefferson quietly turned 53, a year with little external drama at Monticello, strikes at the central and abiding tension in his life. Drawing extensively from such primary sources as Jefferson's correspondence and journals, Jackson sketches

CAREER OPPORTUNITIES with THE NATURE CONSERVANCY

About You

You are a proven success in business, law or science. You understand how mountains, bogs, islands, prairies and our natural heritage relate to your planet's future. You will invest long hours and intellectual effort in conservation for which you can expect competitive pay, benefits and opportunity to grow.

About Us

Our fifty state programs and programs in Canada, the Caribbean and Latin America share a scientifically sound mission that has saved over five million acres. (See the December 1988 issue of *National Geographic*).

About our Opportunities

State Director... work with business, government, and agriculture to create innovative conservation strategies to acquire and manage critical natural areas. You will personally raise funds, manage people and budgets. Positions available in the Dakotas, Massachusetts and Maryland.

Field Representative... plan and implement aggressive programs to protect natural areas for rare plants, animals, and communities. Fundraising, government relations, land acquisition, volunteer programs, land stewardship involve much public contact. Position available in Ohio.

Iowa Director of Science and Stewardship... design preserves, plan and implement land management activities to maintain biological diversity on Conservancy owned sites throughout Iowa. Work with individuals, state agencies and others to identify, protect and manage other critical habitat in Iowa.

For more information . . . on the above listed positions, send letter of inquiry to: **Thomas Walkington, The Nature Conservancy, 1313 5th St. SE, #314, Minneapolis, MN 55414. For more information about other jobs with The Nature Conservancy call (703) 247-3721.** EOE/AA.

The Nature Conservancy

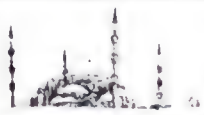
VIXEN HILL GAZEBOS

Discover our wide selection of architecturally authentic gazebos, pre-engineered for easy assembly by the non-carpenter. Send $3 for our 20-page color catalog. Vixen Hill, Dept. SM-0 Elverson, PA 19520. 215-286-0909.

KITES
FREE COLOR CATALOG
Choose from over 100 exciting kites.
• Many unusual & innovative designs.
Call or write for your catalog today!
Into The Wind • (303) 449-5356
1408-R Pearl St., Boulder, CO 80302

THE BEST UNDERSTATEMENT EVER MADE.

Quality fabrics, colors, patterns. Sea-island cotton* boxer shorts you can't buy in stores. For exclusive brochure:
THE GREEN POND COMPANY*
Dept. GP-3 3060 Peachtree Rd., Atlanta, GA 30305, 1-800-827-POND



TURKEY
LAND & SEA
Arrangements for Independent Travel and for Tours.
GOLDEN HORN TRAVEL & TOURS
P.O. BOX 207, ANNAPOLIS, MD 21401
(301) 757-8005 • 1-800-331-8703

Archaeological T-Shirts
• T-shirt: preshrunk, heavy wt., 100% cotton $15.95
• Sweatshirt: 50% cotton/50% poly $25.95
• White shirt/ black design • Sizes: S–M–L–XL
• Shipping add $2, NY State Res. add sales tax
• Send ck/mo to: The Hage Co., 9728 3rd Ave., Dept. 613B, Brooklyn, NY 11209 (718) 680-2350

Phoenician Galley, c. 1000 BC

Toltec Temple Carvings, c. 900 AD

One of America's Largest Fine Watch and Jewelry Discounters

SAVES YOU UP TO 50%
ROLEX • AUDEMARS
PATEK • CARTIER • ETC
DIAMONDS & PEARLS
SALES • SERVICE • ACCESSORIES
815 Connecticut Ave. N.W.
SUITE 204
Washington, D.C. 20006
202/331-0671
800/654-7184
MARCUS & CO.
ELEGANT PRICE CUTTERS SINCE 1971
Free Shop at Home Catalogue

an intriguing portrait of an often-tormented soul, torn between the pleasures of farming and private life, and the recurring need for his leadership in government, in his view made even more urgent in 1795 by the rising star of political rival Alexander Hamilton.

This portrait emerges in the details of each month, from the drenched soil of January and February that delays plowing, to the December celebration of the coming emancipation of one of Jefferson's slaves. Through the cycle of the seasons, the author observes Jefferson in a formidable array of activities, many of them meticulously chronicled in his farm and garden notebooks. Overseeing all manner of livestock and crop production, he is the prototypical American "progressive farmer"—experimenting with new kinds of farm machinery, exchanging information with fellow farmers Washington and Madison on attempts to improve plant variety and crop rotation. Like any other farmer, however, he is not always successful: unrelenting August rains cause permanent erosion damage to much of his property.

Nowhere is Jefferson's passion for farming more apparent than in his cultivation of fruit. He takes the trouble to grow Seville oranges, protecting them indoors in winter, and tends to olive trees he brought back himself from Italy and southern France. His extensive orchard includes cherries, plums, apples, pears, apricots and—his favorite fruit—peaches. He was, notes Jackson, "adept at grafting and budding," and his "love for the peach led him to try thirty-seven varieties during his lifetime."

Alas for Jefferson, such agrarian pleasures of 1795 were guilty ones. The price of playing master of Monticello was allowing Hamilton and the Federalists to run rampant in Philadelphia. In letters exchanged during the course of the year with Madison, John Adams, Virginia Senator Henry Tazewell and others, Jefferson vainly struggles to remain on the farm, offering lame excuses, but by year's end, he bows to the inevitable. It was, in fact, difficult for Jefferson to abandon the evolving republic that he'd done so much to shape; impossible, sadly, to devote himself to dual passions at the same time.

Though it may leave addicts hungry for even more details, *A Year at Monticello* offers eloquent evidence of the versatile statesman-farmer's life on the land. Jackson deals beautifully and precisely with the pull of the earth in Thomas Jefferson.

Frank Levering
Virginia orchardist and writer

A Touch of Genius:
The Life of T. E. Lawrence
Malcolm Brown and Julia Cave
Paragon House, $22.95

"A little bare-footed silk-skirted man" was how T. E. Lawrence modestly described himself at his first meeting in Cairo with Gen. Sir Edmund Allenby, his commander in chief.

That was in 1917, when Lawrence, a diminutive, scruffy-looking British Army captain took to wearing Arab robes and became the guerrilla leader whose exploits were destined to make him, improbably, the great romantic hero of World War I.

Born just over 100 years ago—his centenary was in 1988—Lawrence continues to fascinate and intrigue each new generation. More than 50 biographical accounts have been written since Lowell Thomas, the American journalist and lecturer, transformed him into the international celebrity that he remains, Lawrence of Arabia.

Even in death Lawrence continues to preserve what Thomas (quoting an old Turkish saying) called a "genius for backing into the limelight." And a new generation has now been captivated by his exploits with the recent revival of David Lean's epic film of the 1960s *Lawrence of Arabia.*

But in recent years it is the dark side of T. E. Lawrence, the fallen idol, on which his biographers have concentrated. The focus has been on a person in torment, guilt-ridden, adolescent and sexually inadequate. A figure far removed from the swashbuckling hero described by Thomas as the leader of the Arab revolt and scourge of the Ottoman empire.

His brother Arnold once complained that T. E. Lawrence had become the subject of such extreme adulation or denigration that in "neither of these two over-dramatized figures, the saint and the charlatan, can I really recognize more than a trace of the brother whom I knew and liked."

Saint or charlatan? The authors of *A Touch of Genius* leave readers to make their own judgment. It is a book that gives a balanced view of the man behind the legend and provides a beginner's introduction into an amazingly

Lawrence saw "spider in the web of its own spinning" in 1921 portrait.

complex man who played an important role in shaping today's Middle East.

It was Richard Aldington's fiercely hostile *Lawrence of Arabia: A Biographical Enquiry*, published in 1955, that began the process of denigration of Lawrence, emphasizing his illegitimacy and the inconsistencies in his own accounts of his role in the Arab revolt.

Lawrence's father was an Anglo-Irish baronet who abandoned his wife and daughters, took off with the governess, changed his name and raised a new family. In Aldington's view, the discovery that he was illegitimate was "obviously the clue to Lawrence's abortive career and tortuous character."

Another revelation about Lawrence that surfaced in 1968 was that in dark periods after World War I, between 1923 and 1935, he submitted himself to severe beatings administered by a soldier with whom he had served in the peacetime army.

Arnold Lawrence wrote about this that his "subjection of the body was achieved by methods advocated by the saints whose lives he read." Years later, in an interview, Arnold said, "He hated the thought of sex. He had read any amount of mediaeval literature about characters, some of them saints, some of them not, some ordinary people, who had quelled their sexual longings by beating. And that's what he did."

But apart from sexual problems it was clear from his writings that Lawrence emerged from a bloody guerrilla war stricken with guilt over his involvement in the Arab revolt.

"Pray God" he wrote in his account of his exploits "that men reading the story will not, for love of the glamour of strangeness, go out to prostitute themselves and their talents in serving another race."

Throughout his two years in Arabia he was plagued by remorse that while he was encouraging his Arab friends to fight and die for their independence, Britain and France had already agreed to carve up the region once Turkey was defeated. "I was continually and bitterly ashamed. . . . Had I been an honest adviser of the Arabs," Lawrence wrote in *The Seven Pillars of Wisdom*, his extraordinary account of his experiences, "I would have advised them to go home."

Despite his detractors, and the widely held Arab view that he was no more than Britain's paymaster in the campaign, Lawrence played a vital role in defeating the Turks, as a resourceful guerrilla leader and later as the principal link between the Arab forces and General Allenby.

As a close friend and adviser to Winston Churchill immediately after the war, Lawrence was instrumental in establishing his friend Faisal as King of Iraq and Faisal's brother Abdullah, who had been Emir of Transjordan, as ruler of what is now Jordan.

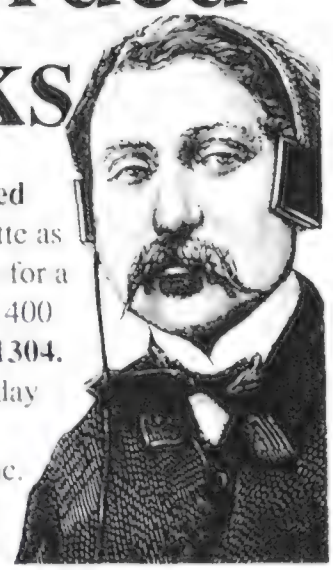
But he never lost his feelings of guilt and despair in the years that followed the war. "Something has gone dead inside me, now" Lawrence wrote to a friend in May 1935, a few days before his death when the motorcycle he was riding smashed up on a winding English country road.

Richard Beeston
Washington correspondent
London Daily Mail

Picture credits

Cover John Huehnergarth; 14 Painting by Joseph Siffred Duplessis/National Portrait Gallery; 22 National Museum of American History; 28 Will McIntyre/Photo Researchers; 32-33 Pierre Boulat/Cosmos; 34 Bowring Cartographic, Pierre Boulat; 35-43 Pierre Boulat; 48-57 John Huehnergarth; 60-71 Michael Melford; 74-77 Chad Slattery; 78 UPI/Bettmann Newsphotos; 78,79 John McGrail; 79 Peter Brandt/*National Enquirer*; 80 Robert Hendrickson; 83 Chad Slattery; 88-93 Jeffrey L. Rotman; 96-107 Farrell Grehan; 110-17 Wayne Sorce; 120-21 Imperial War Museum; 121 William Vandivert/*Life* Magazine © Time Inc.; 122 UPI/Bettmann Newsphotos, IWM; 123 Fred Strebeigh; 124 IWM; 125 Trustees of the Science Museum, London, UPI/Bettmann Newsphotos; 126-27 IWM; 128 IWM, UPI/Bettmann Newsphotos; 129 UPI/Bettmann Newsphotos, BBC Hulton Picture Library; 139 Arthur M. Sackler Gallery; 142 John Emil Cymerman

Recorded Books



Listen to **unabridged** bestsellers on cassette as you drive. Call now for a free catalog of over 400 titles: **1-(800)-638-1304.** Ask about easy 30-day rentals by mail. Recorded Books, Inc. Box 409, Charlotte Hall, MD 20622

WORLD GLOBES
50 Globe Models Hand crafted solid wood floor mountings. Brass meridians
Prestigious addition to home or office
Desk models available
FREE COLOR CATALOG
The Home Library, Dept. 19
160 S. University Drive, Plantation, FL 33324
or Call (305) 579-2116

REPLACEMENTS, LTD.
A Million Pieces!
Active and Discontinued
China, Crystal and Flatware
To Buy or Sell:
Call (919 668-2064, or write:
302 Gallimore Dairy Rd., Dept SM70A
Greensboro, NC 27409-9723 (SASE Please)

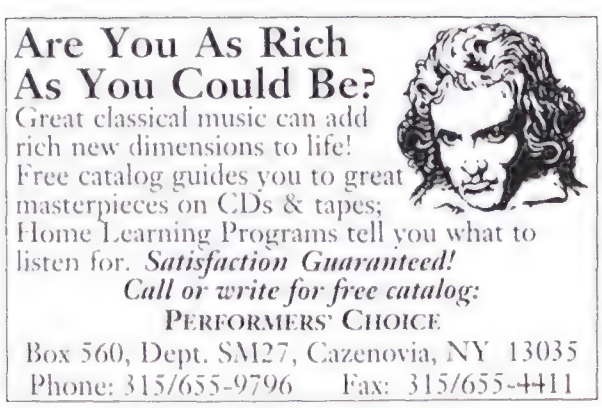
Handcrafted Sterling Silver Pendants
YIN-YANG-Bone & Onyx
Satisfaction Guaranteed
HIS, $18.00 HERS, $15.00
Tenn. Res. Add Sales Tax
Terra TRADING COMPANY P.O. Box 176 - Dept. S Mason, Tenn. 38049
HIS HERS
Send $1.00 for Catalog

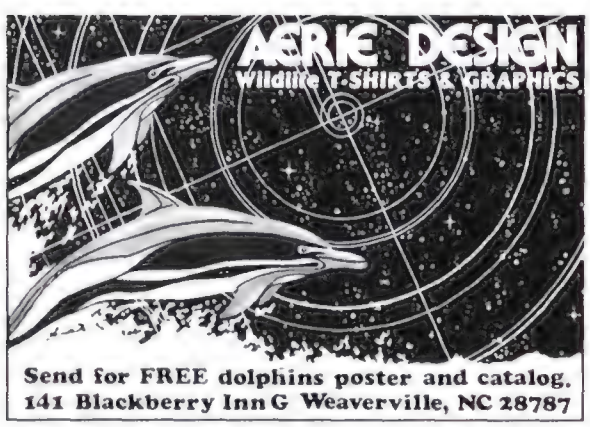
WWII FIGHTER COLLECTION
Authentic Hand Carved 12½" Aircraft Models
A magnificent array of famous combat planes, hand carved out of solid mahogany and hand painted by expert craftsmen
The Kittyhawk Gallery
Dept. 3
915 Broadway
New York, NY 10010
212-529-1144
Call or write for free catalog

THE ULTIMATE CHAIR
for back relief and relaxation!
. . .and 25 other products for a healthy back!

Office Model Available!
BackSaver FREE 14 page catalog
1-800-251-2225 or write
53 Jeffrey Ave., Dept. SM, Holliston, MA 01746 In MA 508-429-5940

Fossils of the Smithsonian Institution reproduced by Skullduggery
Claw of the Allosaurus
Send for your catalog of Natural History items
Skullduggery, Inc
621 South B Street
Department SGO
Tustin, CA 92680
or call (800) 336-7745
Skull of the Stegosaurus


Are You As Rich As You Could Be?
Great classical music can add rich new dimensions to life! Free catalog guides you to great masterpieces on CDs & tapes; Home Learning Programs tell you what to listen for. Satisfaction Guaranteed!
Call or write for free catalog:
PERFORMERS' CHOICE
Box 560, Dept. SM27, Cazenovia, NY 13035
Phone: 315/655-9796 Fax: 315/655-4411


AERIE DESIGN
Wildlife T-SHIRTS & GRAPHICS
Send for FREE dolphins poster and catalog.
141 Blackberry Inn G Weaverville, NC 28787

Additional reading

The Danube (p. 32)

Danube by Claudio Magris, translated from the Italian by Patrick Creagh, Farrar Straus Giroux, 1989

The Danube: 2,000 Years of History, Myth, and Legend by Joseph Wechsberg, Newsweek Books, 1979

The Danube by Emil Lengyel, Random House, 1939

"Danube diversion stirs controversy" by Peter Heywood and Karoly Ravasz, *Engineering News-Record*, February 9, 1989

Travelling on the Danube: From Vienna to the Black Sea, handbook, First Danube Steamship Company (Vienna, Austria)

Fire ants (p. 48)

Silent Spring by Rachel Carson, Houghton Mifflin, 1962

"The Imported Fire Ant: Assessment and Recommendations," Proceedings of the Governor's Conference, Sportsmen Conservationists of Texas, October 1988

Imported Fire Ants: Life History and Impact by S. Bradleigh Vinson and A. Ann Sorensen, Texas A & M University and Texas Department of Agriculture, 1986

The Ants by Bert Hölldobler and E. O. Wilson, Belknap Press of Harvard University Press, 1990

Richard Hunt (p. 60)

Richard Hunt, Dorsky Gallery (New York), 1989

Outside In: Public Sculpture by Richard Hunt, Columbia College Art Gallery (Chicago), 1985

Richard Hunt: Sculpture, Drawings, Prints, Art Center (Waco, Texas), 1978

The Sculpture of Richard Hunt, Museum of Modern Art (New York), 1971

Bubble gum (p. 74)

The Great American Chewing Gum Book by Robert Hendrickson, Stein and Day, 1980

The Chewing Gum Book by Robert Young, Dillon (Minneapolis), 1989

The Trouble With Gumballs by James Nelson, Simon & Schuster, 1956

Philip K. Wrigley: A Memoir of a Modest Man by Paul M. Angle, Rand McNally, 1975

Schooling fish (p. 88)

Red Sea Reef Fishes by John E. Randall, Immel Publishing (London), 1983

The Behavior of Teleost Fishes, edited by Tony J. Pitcher, Johns Hopkins University Press, 1986

Schooling in the Ecology of Fish by D. V. Radakov, John Wiley & Sons, 1973

Roberto Burle Marx (p. 96)

The Tropical Gardens of Burle Marx by P. M. Bardi, Reinhold, 1964

"Roberto Burle Marx: The One-Man Extravaganza" by Frederick L. Gregory, *Landscape Architecture*, May 1981

"South America: Appraisal of a Master Artist" by Anthony Walmsley, *Landscape Architecture*, July 1963

"A Garden Style in Brazil to Meet Contemporary Needs" by Roberto Burle Marx, *Landscape Architecture*, July 1954

Jamaica Bay (p. 110)

The World of René Dubos, edited by Gerard Piel and Osborn Segerberg jr. for the René Dubos Center for Human Environments, Henry Holt & Co., June 1990

The Urban Naturalist by Steven D. Garber, John Wiley & Sons (New York), 1987

The Forests and Wetlands of New York City by Elizabeth Barlow, Little, Brown, 1971

Radar (p. 120)

A Race on the Edge of Time by David E. Fisher, McGraw-Hill, 1988

The Battle of Britain by Richard Hough and Denis Richards, W. W. Norton, 1989

Radar Days by E. G. Bowen, Adam Hilger (Bristol, England), 1987

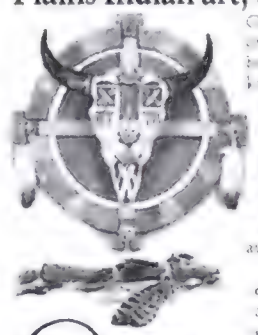
The RAF at War by Ralph Barker, Time-Life Books, 1981

PLANET EARTH
A COMMEMORATIVE EARTH DAY POSTER FROM THE APRIL 1990 SMITHSONIAN

The Poster measures 21¾" x 28¾"
Printed on Recycled Paper
Allow 4 to 6 weeks for delivery

Send $5.00 with address to:
Smithsonian Magazine, P.O. Box 23624,
Washington, D.C. 20026-0624

Plains Indian art, artifacts and jewelry.



Colorful, educational catalog shows over 100 beautiful examples of mounted buffalo skulls, bow and arrow sets, knives, painted buffalo and elk robes, shields, axes, lances, dance sticks, dolls, ceremonial pipes, rattles, shirts, cougar fang necklace, other bone jewelries, silver jewelry and more unique gifts, stunning decorations and collector's items from exclusive source. All are hand made with authentic materials.

Catalog tells the fascinating story of each item's place in Cheyenne, Sioux and Blackfoot heritage. For your copy send $3.00

PRAIRIE EDGE DEALER INQUIRIES INVITED

PHONE SALES CATALOG REQUEST OFFICE

PO Box 4703 Dept SMC

Rapid City, S.D. 57709-4703 605/341-4525

VISIT OUR STORES IN SANTA FE, N.M. AND DEADWOOD, S.D.

HAND MADE IN EGYPT

Cartouche

18 K Solid Gold from $140.00
Sterling Silver from $ 35.00

A talisman with your name in Ancient Egyptian Hieroglyphics.

Free info 1-800-283-4978 Visa · MC · Am-Ex · Disc
Write: Cartouche Ltd, Box 8474-2, Pgh., PA 15220

ANGKOR WAT

. . . plus Laos, Vietnam and Burma. 26 days. Many successful tours—now monthly departures beginning September. American citizens join us in Seattle. We arrange your entry and exit visas. Details:

WINGS OF THE WORLD, INC.
653 Mount Pleasant Road, Toronto, Ontario
M4S 2N2, Canada (416) 482-1223

Windjammer Sneak-away!

Sail smack against the tide of modern conformity!

Out O' Mystic Schooner Cruises
Box 487, Mystic, CT 06355
free brochure
Instant Reservations 1-800-243-0416

12-DAY CRUISES FROM $99/DAY

Belize • Great Barrier Reef • Guatemala • Jungle River • Mayan Ruins • Florida Everglades • Dry Tortugas • Virgin Islands • Caicos • Columbus Discovery • RI-FL Intracoastal Nov. & May • Canada Saguenay via Erie Canal Summer

800-556-7450 For Free Brochure

American Canadian Caribbean Line, Inc.
The Small Ship Cruise Line Warren, RI 02885

GET PAID FOR READING BOOKS

$50-$100 PER BOOK. CHOOSE SUBJECT MATTER. NO RESUME REQUIRED.
FOR FREE INFORMATION WRITE:
CALCO PUBLISHING (Dept. D-34)
500 South Broad St., Meriden, CT 06450

CALCO, INC. 1989

日本刀 JAPANESE SWORDS

For Free Evaluation Sheet

TOLL FREE 800-435-5119

$200 $250,000 CASH PAID

French Art Glass (Galle, Daum), Tiffany Lamps Also Wanted

David E. J. Pepin—Member NBTHK, Tokyo, Japan
Dept. SI, P.O. Box 354, Grant Park, IL 60940

Smithsonian highlights

Planning a Smithsonian visit?

The Associates' Planning Packet is yours for the asking. Send a postcard to Associates' Reception Center, Smithsonian, Washington, D.C. 20560, or call (202) 357-2700. For hearing-impaired visitors, use TDD and call (202) 357-1729. Begin your visit at the Associates' Reception Desk, located in the Smithsonian Castle.

Castle reopens, Freer remains closed

The Castle has reopened with a new Smithsonian Information Center and Associates' Lounge. Hours are 9 A.M.-5:30 P.M. daily. The Freer Gallery of Art is closed until 1992.

Festival of American Folklife

The Smithsonian's 24th annual celebration will be held on the Mall, June 27-July 1 and July 4-8, from 11 A.M. to 5:30 P.M. This year's festival will focus on the U.S. Virgin Islands and the country of Senegal. For information, call 357-2700.

Musical Matinee

On Sunday, July 15, the Friends of Music at the Smithsonian will sponsor a private concert and luncheon at the estate of Smithsonian Secretary Emeritus S. Dillon Ripley and Mrs. Ripley, in the Litchfield Hills of northwestern Connecticut. This gathering of friends for fine food and music will feature a performance by the Castle Trio on period instruments. Proceeds will benefit the Smithsonian's Division of Musical History. Seating is limited. For information or reservations, write to: Musical Matinee, NMAH/R. 4123, Smithsonian, Washington, D.C. 20560.

Special July exhibits and events

Arthur M. Sackler Gallery
Yokohama: Prints from Nineteenth-Century Japan (through September 9) Eighty-five color woodblock prints. See *Highlights continued*, page 139.
The Noble Path: Buddhist Art of South Asia and Tibet (through September) More than 100 objects reflecting the changing imagery of Buddhism.

Cooper-Hewitt Museum (New York)
Flora Danica *and the Heritage of Danish Porcelain, 1790-1990* (through September 2) Two hundred years of Danish design.
Color, Light, Surface: Contemporary Fabrics (through September 23) Textiles crafted during the past decade.

National Museum of Natural History
Life in the Ancient Seas A major new installation, showcasing 2,000 fossils and featuring a coral reef diorama.
A Jeweler's Art: Masterpieces from Van Cleef & Arpels (July 12-indefinite) The famed jewelry company's creations, 1920s through '50s.
Gorilla: Struggle for Survival in the Virungas (through August 12) Photographs taken in Uganda by Nick Nichols.
Twentieth-Century Dinosaurs (through August 10) Models by sculptor Jim Gary.
Dinamation's Dinosaurs, Alive and in Color (through September 3) A menagerie of 18 animated robotic dinos (admission fee).

Renwick Gallery
Four Contemporary Calligraphers (through October 28) Twenty-two English, Chinese, Arabic and Hebrew manuscripts.
Tradition and Innovation: New American Furniture (through September 3) An overview of creations by 25 artisans.

National Museum of American History
Information Age: People, Information & Technology A major new permanent installation, featuring an interactive gallery and more than 800 artifacts, photographs and graphics.
From Parlor to Politics: Women in the Progressive Era, 1890-1925 (through June 1991) A look at the outstanding reformers of the early 20th century.

Become a Smithsonian Traveler

Whether it's an invigorating hike through Utah's Arches and Canyonlands or a leisurely cruise on the Volga, the Smithsonian National Associate Program has learning adventures for every taste and budget.

- Explore California's Channel Islands
- Spend a fortnight in the countryside of Hungary, France or Denmark
- Immerse yourself in Southwestern literature and art, or study archaeology in Santa Fe
- Experience Oxford University during a residential seminar
- Help transfer historic Smithsonian photographs to videodisks in Washington, D.C.
- Collect fossils with Smithsonian scientists in Wyoming
- Ride horseback along the 1805 Lewis and Clark trail in Idaho

. . . or take part in one of the nearly 200 other study tours, seminars and research expeditions that mirror the magnificent diversity of your national museums. For further details, see The Smithsonian Traveler, page 140.

The East Broad Top Railroad (July 6-September 13) Forty photographs document the restoration of a 1912 narrow-gauge steam locomotive.

National Museum of African Art
Yoruba: Nine Centuries of African Art and Thought (through August 26) Masterworks from Nigeria and Benin.
Icons: Ideals and Power in the Art of Africa (through September 3) A survey of African art.

National Museum of American Art
Missouri Portfolio: The Drawings of George Caleb Bingham (through August 19) More than 100 works.
Albert Pinkham Ryder (through July 29) A retrospective on America's "greatest painter of the imagination."

National Portrait Gallery
The Five of Hearts (through November 4) Portraits of a 19th-century circle of friends, including Henry Adams and his wife, Clover.
Working for Time: The Covers of Robert Vickrey (through November 4) Portraits of subjects from Nelson Rockefeller to John Updike.

Hirshhorn Museum & Sculpture Garden
Bay Area Figurative Art, 1950-1965 (through September 9) More than 60 paintings by artists from Richard Diebenkorn to David Park.
DIRECTIONS: Christian Marclay (through September 30) The New York artist's assemblage of discarded artifacts from the music world.

National Air and Space Museum
Trust But Verify/Do Veri, No Pro Veri A new permanent exhibition features a U.S. Pershing II missile and a Soviet SS-20 missile and explains the Intermediate Nuclear Forces (INF) treaty between the two countries.
A Piece of Mars? (indefinite) The fragment of meteorite found in Antarctica in 1979 and thought to be from Mars.

Exhibition catalogs

Catalogs available currently include:
Yokohama: Prints from Nineteenth-Century Japan ($26.95, paper; $45, cloth)
Gorilla: Struggle for Survival in the Virungas ($19.95, paper)

To order, send check or money order to Museum Shops, 3301 75th Avenue, Landover, Maryland 20785. Include 15

Special Care for Special People

Progressive education, home environment for the mentally handicapped child and adult. Opportunity for educational progress at any age – multiple recreational and social activities. A year-round program with an active and full lifestyle among friends on a 600-acre bluegrass estate. Est. 1893. Phone 502-875-4664 or write

THE STEWART HOME SCHOOL
Box 96, Frankfort, KY 40601
John P. Stewart, M.D., Resident Physician

DIDGERIDOOS

Guaranteed authentic Australian musical instrument. 3 feet long, hand crafted and painted by local Aboriginals. Comes with playing instructions. $125 and or send $2 US for photo and further information.
MINAJI. PO BOX 2001, CHERMSIDE, AUSTRALIA 4032. Phone Aust. (+61) 7-2663871.

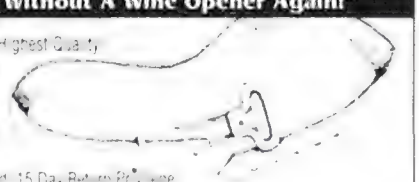
LUXURY YACHT CRUISE
1-800-648-3393
Book individuals or groups on 18-20 Pax Luxury Trimarans - Largest in the World. Choice of two beautiful island groups
GALAPAGOS • BRITISH VIRGINS
Trimarine Dept. SM Box 4065 St. Thomas VI 00803

BOOK AUTHORS!
Join our authors in a complete, reliable publishing program: publicity, advertising, handsome books. Speedy, efficient service. Send for *FREE* manuscript report & How To Publish Your Book.

Carlton Press, Inc. Dept. SLG
11 West 32 Street · New York 10001

GALAPAGOS
You, 9 other adventurers and our licensed naturalist will sail by yacht to explore more islands than any other Galapagos expedition. 50 Trip dates. Machu Picchu Option.
FREE BROCHURE
INCA FLOATS 415-420-1550
1311S 63rd ST, EMERYVILLE, CA 94608

THE WINE BELT™
"Never Be Without A Wine Opener Again!"



We've Combined The Highest Quality German Wine Opener Which Serves As A Detachable Bracelet With Fine Oil Tanned Leather Belting
Satisfaction Guaranteed. 15 Day Return Privilege
$39.95 (add $3.50 shp/hnd) Check, Visa, MC (card exp date)
CA residents add sales tax. Sizes 36-42. Colors: Black, Brown. Width: 1 3/8
THE FINE COLLECTION
977 E. Stanley Blvd., Ste. 223A
Livermore, CA 94550

SMITHSONIAN SUBSCRIBER SERVICE INFORMATION

CHANGE OF ADDRESS: PLEASE GIVE US 6 WEEKS ADVANCE NOTICE

ATTACH LABEL FROM RECENT ISSUE HERE
OR PRINT OLD ADDRESS AS WELL AS
NEW IN SPACE BELOW

NAME _____
(please print)

OLD ADDRESS _____

CITY _____ STATE _____ ZIP _____

NEW ADDRESS _____

CITY _____ STATE _____ ZIP _____

Return this coupon to:
SMITHSONIAN MEMBERSHIP-SUBSCRIPTION DATA CENTER
P.O. BOX 55593 BOULDER, COLORADO 80322-5593

(Whenever possible send your present magazine mailing label)

In order to:

- **Change your address**
- **Inquire about . . .**
  The status of your membership-subscription
  Dues payments
  Gifts
- **Report missing issues or membership cards**
- **Correspond about related matters**

Please write to our computer data center where all these records are maintained and be sure to include either your magazine mailing label or membership number as it appears on your membership card:

SMITHSONIAN
MEMBERSHIP-SUBSCRIPTION DATA CENTER
P.O. BOX 55593
BOULDER, CO 80322-5593
TELEPHONE (303) 449-9609

A capable staff is on hand at this location to accommodate you and give prompt attention to your requests.

Please do not write to the Institution in Washington about these matters as it will only delay response. If you need special service for unusual circumstances, please write to Circulation Department, SMITHSONIAN Magazine, 420 Lexington Ave., New York, N.Y. 10017.

percent of total purchase to cover postage and handling (minimum, $1.75).

Smithsonian on the air

Radio Smithsonian: Features include stories on information technology, contemporary American Indian art and pianist Gary Steigerwalt.
Here at the Smithsonian: Three-minute TV spots take you behind the scenes.
To find out which stations in your area carry these radio and TV programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.

Smithsonian National Associates

The Program hosts events in St. Louis, Missouri, July 19-22.

For further information, write or call U.S. and International Events Program, 490 L'Enfant Plaza S.W., Suite 4210, Washington, D.C. 20560; (202) 287-3210.

Resident Associate Program

To become a Resident Associate, or to get fee and ticket information, call 357-3030.

Tears Come Rollin' Down: Country Blues with Henry Townsend (July 15; 7 P.M.) The genius of the great bluesman and songwriter.
The Vanderbilts (July 16; 8 P.M.) Biographer Jerry Patterson on the legendary family.

Smithsonian Institution Traveling Exhibition Service

SITES organizes and circulates exhibitions to cities throughout the United States and abroad. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some July exhibits:
Glens Falls, New York (July 7-August 19) *Drawings by Utagawa Kuniyoshi: Sketches for Japanese Prints*, Hyde Collection.
Omaha, Nebraska (July 7-August 26) *Portraits and Prospects: British/Irish Drawings and Watercolors from the Ulster Museum, Belfast*, Joslyn Art Museum.
Sacramento, California (July 21-August 19) *Vietnam Veterans Memorial: A National Experience*, Medical Clinic of Sacramento.
Valdez, Alaska (July 14-August 12) *Sea Stars*, Valdez Museum.

The West, seen through Eastern eyes

Woodblock print produced by master artisan Sadahide during the winter of 1859-60 offers his exactingly detailed panorama of newly opened port of Yokohama.

"Here, out of a marsh by the edge of a deserted bay," wrote a British diplomat dispatched to Japan in 1859, "a wave of the conjurer's hand had created a considerable and bustling settlement." The thriving township he described was Yokohama, constructed in only a few months' time from swamplands on the southwestern edge of Edo Bay.

The opening of Yokohama to trade with Europe and America in 1859 ended more than two centuries of Japanese isolation and transformed a rural fishing village into a thriving international port. Erected at the express command of the Tokugawa shogunate, the city, with its neatly laid out streets, housing compounds and Japanese merchants' district, became the preserve of foreigners.

The arrival of the British, Americans, French, Russians and Dutch—all signators of a new trade agreement—occasioned intense curiosity throughout Japan. The community of artisans in nearby Edo (present-day Tokyo) began producing a flurry of prints depicting the novel customs, costumes and inventions of the newcomers.

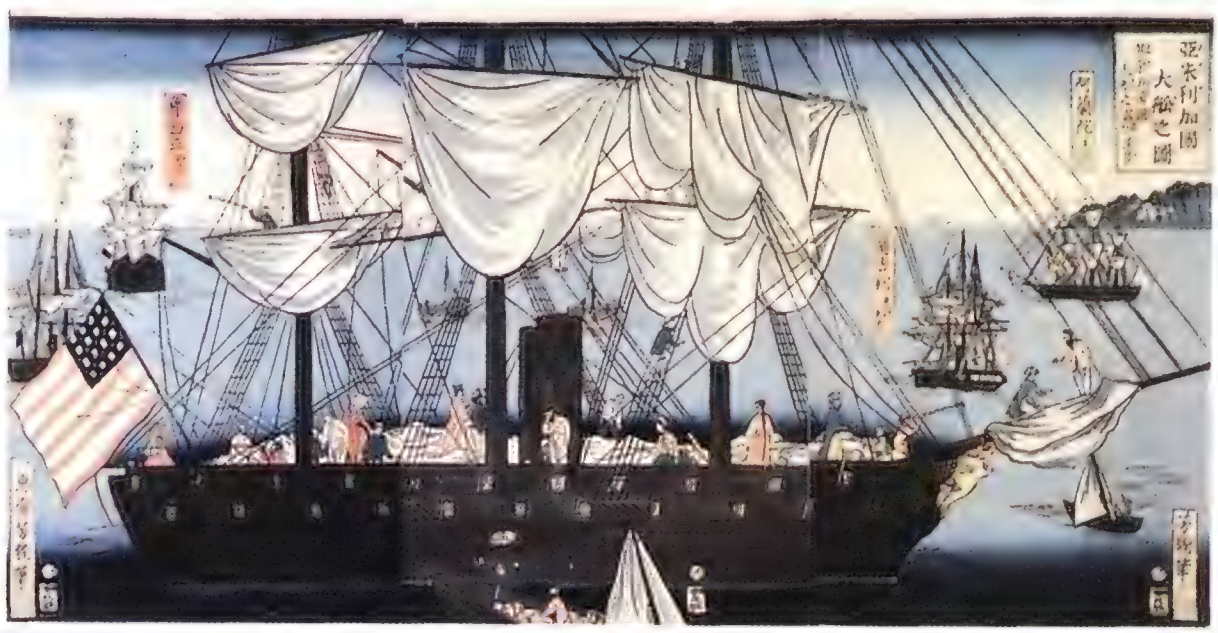
Everything from steamships to glass tableware and crinoline petticoats fascinated Japan's artists, who created thousands of images documenting this first modern encounter with the West. The woodblocks they produced, exquisite and winsome, form the centerpiece of "Yokohama: Prints from Nineteenth-Century Japan" at the Arthur M. Sackler Gallery. Organized by assistant curator Ann Yonemura, the exhibition is a selection of prints from the collection of William and Florence Leonhart.

After closing on September 9, the show continues on to the Asian Art Museum of San Francisco and the Los Angeles County Museum of Art. A singularly absorbing catalog, written by Ann Yonemura and designed by Carol Beehler, accompanies the exhibition.

Kathleen M. Burke

An 1861 image by Kunihisa depicts an American couple; the artist adapted odd headdress from Western illustrations.

In Yoshitora print, a bearded foreigner views autumn moon in the company of a courtesan wearing traditional kimono.



Yoshiiku's scene of an American ship, surrounded in Yokohama harbor by vessels of the other four treaty nations, was completed by the young artist in 1861.

The Smithsonian Traveler

THE LATEST WORD ON TOURS, EXPEDITIONS AND LEARNING ADVENTURES.

Smithsonian "Anytime" Weekend
Explore Washington, D.C.'s museums; enjoy a "Castle" tour; see "Dinosaurs Alive and in Color" through Labor Day.

Domestic Study Tours

Lewis and Clark *August 5-12* Horseback camping on the 1805 trail in Idaho.

Baseball Nostalgia *August 13-19* Chicago, Detroit and Cleveland; *September 5-11* Boston, New York and Baltimore.

Arches and Canyonlands *September 1-8*

Delta Queen *September 4-12*

Maine Hiking *September 9-18* Explore Deer Isle, Acadia National Park and Baxter State Park.

NEW America's Maritime Heritage *September 11-22* Cruise from Boston to Washington, D.C. on the *Nantucket Clipper.*

Historic Philadelphia *September 13-16* Includes Barnes Foundation, Society Hill.

Grand Canyon Weekend *September 13-16 or 27-30* Hike with a naturalist.

Wild California *September 16-25* From Big Sur to Yosemite.

Columbia River Cruise *September 20-30*

San Antonio and Austin *October 6-13*

NEW Chesapeake Birds *October 6-13*

NEW California's Channel Islands Cruise *October 8-13 or October 15-20*

Bryce, Zion and the North Rim *October 9-19* Stay in rustic lodges.

NEW Historic Houses of North Carolina *October 10-17* New Bern, Edenton.

NEW New York City European Treasures *October 11-14*

NEW Sapelo *October 11-15* Explore this barrier island near Savannah.

Christmas in Santa Fe *December 20-27*

Florida Everglades *January 22-30* Canoe the Ten Thousand Islands.

Foreign Study Tours

European Countryside Programs *August-October* Relax in Austria, Denmark, England, France or Hungary.

NEW Edinburgh Music Festival *August 12-22*

St. Lawrence *August 16-27* Quebec, Montreal and Toronto with a four-day cruise through the Thousand Islands.

NEW Volga Cruise (USSR) *August 18-September 6* Cruise from Moscow to Kazan' through Golden Ring towns.

Byzantium Voyage *August 20-September 4* Venice to Istanbul on the *Argonaut.*

Indonesia *September 6-27*

Central Asia (USSR) *September 7-20* Includes Samarkand and Bukhara.

NEW Three Republics (USSR) *September 9-23* Russia, Georgia, Estonia.

English Canals *September 11-23*

Yugoslavia *September 11-23*

NEW Spain *September 11-23*

NEW Glasnost and Perestroika (USSR) *September 12-23* Study current affairs.

Switzerland by Train *September 12-24*

Ireland Walk *September 18-28*

Rhône Cruise *September 18-October 2* Provence, Burgundy, Paris.

NEW Modern Masters in the South of France *September 30-October 10*

Brazil *October 1-18*

Cotswold Walks *October 4-16*

NEW Castles and Gardens of Czechoslovakia and Hungary *October 5-19*

Turkey and Greece *October 10-23* Cruise aboard the tall ship *Sea Cloud.*

NEW Splendors of South China Seas *October 11-31* Hong Kong, Thailand, Java, Bali.

Australia *October 13-30*

Japan *October 15-27*

Folk Art and Celebrations of Colonial Mexico *October 27-November 8*

NEW Bermuda *November 1-6*

Interludes *November-April* Uncrowded museums, cultural events and leisurely exploration in London, Venice, Munich, Prague, Paris, Lisbon, Vienna, Hong Kong, Kyoto.

Christmas in Europe York and Edinburgh, Canterbury or Switzerland.

Christmas in the Caribbean Enjoy St. Kitts or a Virgin Islands cruise.

South America Adventure *January 3-23* Cruise around Cape Horn on the *Seabourn Pride.*

India Wildlife *January 13-February 7*

Yucatán Adventure *January 16-28*

USSR Performing Arts *January 18-31* Attend performances at the Bolshoi and Kirov theaters.

Kenya-Tanzania *January 24-February 10*

Far East Express *February 1-21* Malaysia and Thailand by train.

Pakistan *February 5-22*

Countryside Tours *February-September* Relaxing sojourns in Mexico, Greece, Italy, France, England, Switzerland, Austria, Wales, Czechoslovakia and Germany.

Smithsonian Seminars

Explore diverse topics in depth with top scholars during classroom study and tours.

Trinity College (Ireland) *August 11-25* Study Irish art and architecture.

NEW Rome *September 13-25*

Oxford-Smithsonian (England) *September 15-29*

Aircraft Restoration *September 24-27* Learn from expert craftsmen at the Paul E. Garber Facility near Washington, D.C.

Highlights of Austrian Civilization *October 6-17* Salzburg and Vienna.

NEW American Folk Art *October 9-12* Washington, D.C.

Write to Smithsonian National Associate Program, Washington, DC 20560 or call (202) 357-4700 for tour and seminar brochures.

SMITHSONIAN-STYLE

NEW Chesapeake Bay Ecology *October 14-18* Annapolis. Learn at the Smithsonian's Environmental Research Center.

The Art and Craft of Creative Writing *October 14-18* Annapolis. Stay at a historic inn; study and write with SMITHSONIAN columnist Edwards Park.

Santa Fe *October 28-November 2* Explore Southwestern art, archaeology or literature.

Egypt *November 16-December 1* Classes in Cairo; cruise on the Nile.

NEW Russia-Eastern Europe Update *November 27-30* Washington, D.C. Scholars and journalists discuss dramatic changes in these regions.

NEW The Venetian Tradition *January 15-18* Washington, D.C. See Titian and Van Dyck exhibitions at the National Gallery of Art.

American Antique Furniture *January 28-31* Washington, D.C.

Exploring the Sea *February 3-7* Fort Pierce, Florida. Study marine biology.

Myth, Icon and Art *February 20-23* Washington, D.C.

Broadcast Journalism *March 10-15* Washington, D.C.

Research Expeditions

Contribute your talent and financial resources to Smithsonian research. Work with curators in Washington, D.C. or at field sites worldwide.

Montserrat *July 15-28* Excavate a Caribbean sugar plantation.

Cody, Wyoming *July 15-28* Collect plant fossils near Yellowstone.

Washington, D.C. *July 22-August 4* Archive historic aviation documents.

New York City *August 1-11* Reconstruct Caribbean pottery.

Orofino, Idaho *September 11-21* Record Lumberjack Days festivities.

Washington, D.C. *October 28-November 3* Learn about electronic photography as you transfer still photographs to videodisks.

(202) 287-3210 for expedition brochures.

STEUBEN 1990 CATALOGUE

120 pages of brilliant crystal gifts and selections for collectors, priced from $135. Shown above, Nimbus Vase by Paul Schulze.

Catalogue $8. Order with credit card by calling 1-800-223-1234.

STEUBEN

THE CLEAREST FORM OF EXPRESSION

48

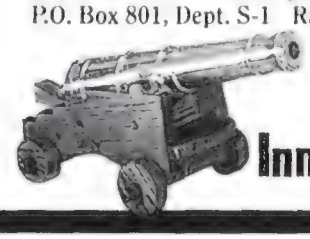
Part of Corning since 1918. © Corning 1990

Shedding light on a bygone era...

Imagine this handsome table lamp in your home! Mounted on the base is a finely-detailed 1/12 scale solid brass model of a 32-pounder – the muzzle-loading cannon used on U.S. fighting frigates. Barrel is approx. 9" long; the lamp is 24" high, including the brass finial atop the decorator-quality cloth shade. Carriage and base are solid maple. All brass parts are heavily lacquered for care-free beauty. Accepts standard 3-way bulb. The perfect gift for collectors, history buffs, sailing enthusiasts – and yourself!

Only $159, including insured delivery (N.J. residents, add $9.00 sales tax) Please allow six weeks for delivery. Return in 14 days for refund if not satisfied.

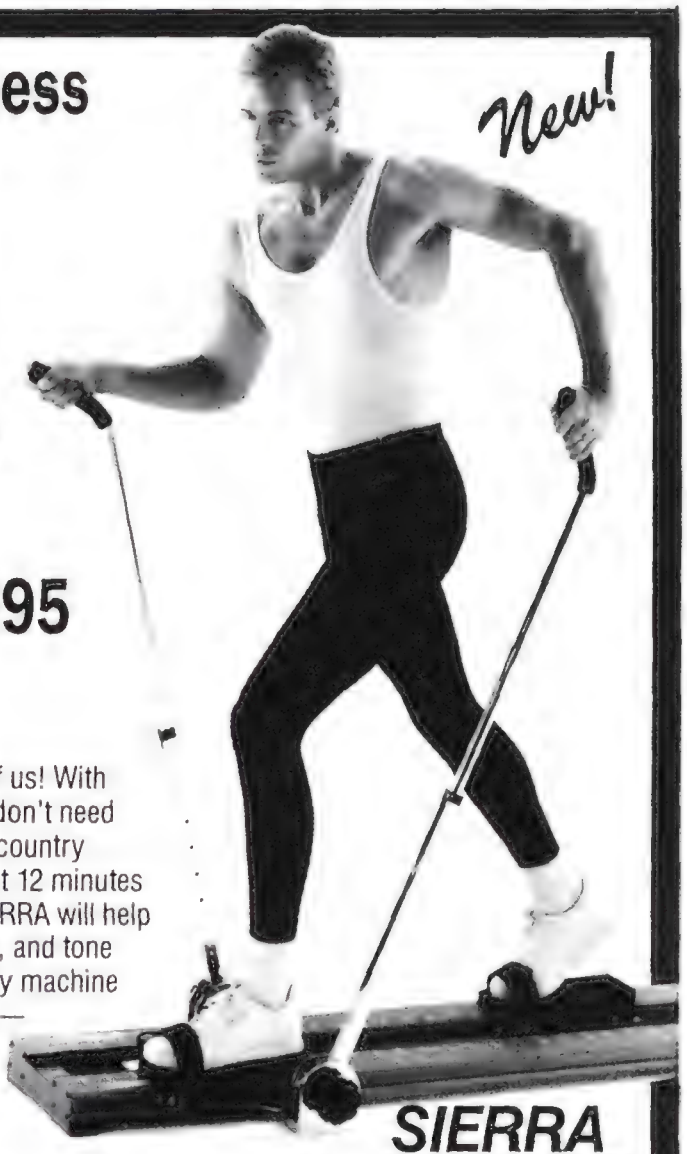
Please enclose separate note with your name and address and check – or include your VISA or MASTERCARD number with expiration date and signature. Mail to: P.O. Box 801, Dept. S-1 Ramsey, NJ 07446



Innova-Tech

Now...Lasting Fitness Begins with This Simple Exercise:

Dial 1-800-328-8995



For a Free Brochure on the New *SIERRA*

Now there's a ski exerciser for the rest of us! With the new SIERRA by Fitness Master, you don't need the balance and coordination of a cross-country athlete to reach your fitness goals. In just 12 minutes a day, three to five times a week, the SIERRA will help you shed pounds, strengthen your heart, and tone muscles, too. On this sturdy user-friendly machine you can burn up to 900 calories an hour — with less risk of muscle strain or injury than other forms of exercise.

Call or write today — no obligation!

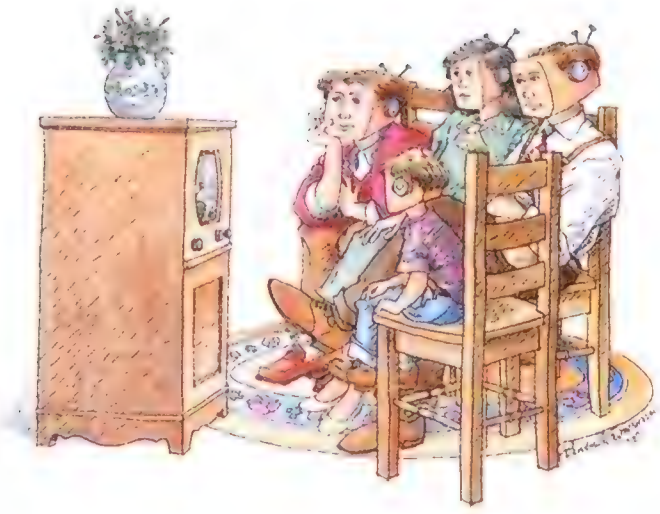
Made in the USA by

Fitness Master 504 Industrial Blvd. Dept. SM, Waconia, MN 55387

SIERRA
AEROBIC CONDITIONER

By Daniel Pinkwater

When it came to TV, my father knew best



This is the story of the infantile television, of my early life and of my father, a borscht-swilling, two-fisted son of a gun from Warsaw. I grant that I did not watch television from my bassinet, as subsequent generations seem to have done. And I did have a couple of years of exposure to pre-TV culture. When I got to college it was still an expulsion offense to smuggle a set into the dorm—but such instances of video deprivation, which I sometimes weave into tales to astonish the young, do not signify. For better or worse, I grew up with the tube like most Americans now alive.

It was in 1948 that television took over. At the beginning of that year there were 19 TV stations in operation and about 186,000 sets in American homes. At year's end there were more than twice as many stations broadcasting and a million sets in place.

After that it was just a matter of numbers—what television would become and what it would make of us was manifested and even refined in that first epochal year.

I was in on it. My older brother, with the first paycheck from his first job, surprised the family by bringing home an RCA—I think it had a ten-inch screen, a superluxury model. It was set up in the living room, and a row of straight chairs was placed in front of it.

I remember the first televised image we saw on that first night. It was a bunch of mountaineers, with forked beards, sitting in a row, on chairs, playing jugs and spoons, and stamping their bare feet.

I can recall thinking that the hillbillies resembled the antique photographs of some of the ancestors my father had left Europe to get away from. He resented having been born on the other side of the water and in the 19th century, which he regarded as benighted and backward. "I yam no beck nomberr," he would say. "I yam a tventiet'-century man."

Having gotten tired of fighting with Gentile hoodlums (and Jewish hoodlums, with whom he also tangled), he had walked across most of Europe and had caught a boat for the New World. He had been profoundly impressed by the New York World's Fair in 1939, and considered it his duty as an American to buy into the world of the future. As new inventions and gimmicks were created he got hold of them. The war had cut off the availability of modernist household gadgets, but now the flow was steady, and we had an electric juicer, home movies and a vacuum that resembled the family Buick.

My brother had beaten my father to the punch badly by bringing home the TV set, and perhaps had even gone too far and shown disrespect. But my father did not decry the undertaking as a waste of time, nor suggest that my brother had fallen for hype advertising by purchasing an inferior black-and-white set when, surely, color was not more than a few months away. He knew or sensed that anything of that sort would be sacrilege. He took his place in the row of chairs in the darkness and marveled at the hillbilly band. Talking pictures piped right into the living room, he suddenly realized, was what America was all about. And of course, everybody else was realizing the same thing in 1948.

While the rest of the family was still getting used to having a television, one of us was ready to begin to worship the box with his whole heart and live his life by the flickering blue light. That was me. I discovered the afternoon children's programs—cartoons, ancient even then, recycled black-and-white ones with hordes of mice chasing and being chased by Farmer Brown; vivified serials, with Flash Gordon and his clone, Buck Rogers; and Westerns with Hoot Gibson, Yakima Canutt and William Boyd as the legendary Hopalong Cassidy. By the simple expedient of eliminating healthy outdoor exercise, the likes of myself had time to view them in the hours between the end of school and suppertime. I was the first to be sacrificed (willingly, mind you) on the electronic altar.

My father was to establish a relationship with the set as intimate as my own. A year or so after the family's first exposure, he acquired a much larger set and rearranged a spare bedroom into what would later be called "the den." He shifted an old couch and some easy chairs into the room, and discovered the wildly popular trays with folding legs of tubular metal. Later there appeared a special TV night-light, purchased because watching TV in pitch darkness might result in premature myopia. It was my father who introduced into our family the other (other than TV itself) signally important innovation of the period, the TV dinner, after which life would never be the same. He assumed his rightful place as impresario of our little home theater. He would dust the cabinet and polish the screen. During commercials he would disappear into the kitchen and bring us ice cream, scooped by his own hand. (About this time, my brother moved into his own apartment, taking the little RCA with him, and began to see a psychoanalyst.)

My father took to viewing wrestling with enthusiasm, was a shrewd and critical watcher of the news and enjoyed an occasional drama, if it was live. He refused to look at reruns, even if he hadn't seen the show the first time.

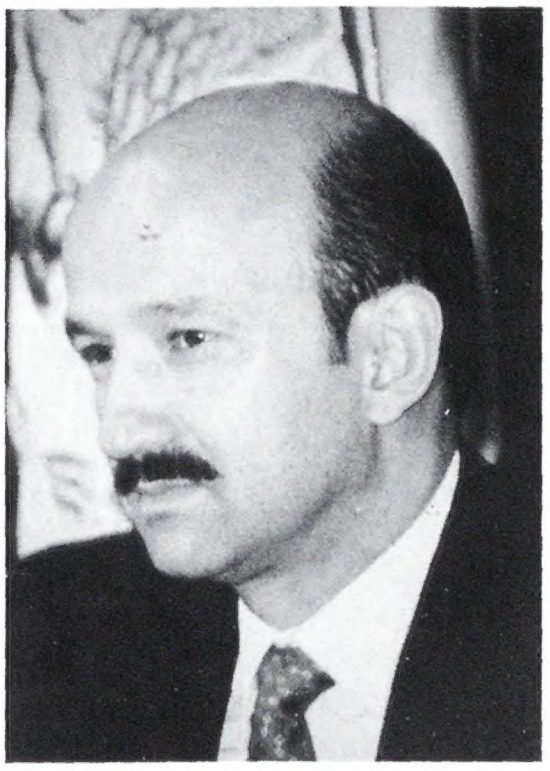
"I didn't paid out four hunnerd dollars for this fine television to look on old programs," he'd say, stroking the mahogany veneer. Somehow I think he would have approved of MTV. More modern than anyone, was my old man.

"If We Don't Address The Issue Of Global Ecology, We Won't Have To Worry About The Other Issues."

CARLOS SALINAS DE GORTARI
PRESIDENT OF MEXICO

June 5, 1990 is a proud day for Mexico.

On that day the Mexican Government plays host to United Nations' World Environment Day, the purpose of which is to send forth a clear message:
Let us build a better planet for children.



A New Crusade.

It had its beginnings in 1972 with the establishment of the first "Conference Of The United Nations On The Environment," held in Stockholm.

Its purpose then was to monitor changes in the environment worldwide, and engender proper environmental practices.

The people and Government of Mexico take pride in supporting what came to be known as "The Declaration Of Stockholm," a key component of which called for declaring the 5th of June World Environment Day.

An Optimistic Focus.

World Environment Day will start with a commemorative ceremony in the Palace of Fine Arts with a keynote address by the President of Mexico.

Emphasis will be on achievement already realized in terms of scientific, technological and social contributions to such problems as acid rain, desertification, loss of species, contamination of the oceans, and atmospheric changes.

The point will be made to the world that Mexico stands as a nation for the principle that a healthy environment is essential for the common future of humanity, with particular stress on the quality of life our children will inherit.

Environmental Partnership

The World Environment Day Honor Committee includes U.N. Secretary General Javier Perez de Cuellar, President George Bush of the United States, Prime Minister Brian Mulroney of Canada, President Rafael Angel Calderon Fournier of Costa Rica, President Mikhail Gorbachev of the Soviet Union, Prime Minister Margaret Thatcher of the United Kingdom and many other world leaders.

Sponsors include offices of government, international and domestic environmental organizations and enterprises, youth groups and members of the artistic and cultural community. These organizations will host forums to discuss local, national and world environmental problems.

Trees Mean Life.

Trees consume carbon dioxide emitted by coal-fired power plants and other sources. And carbon dioxide is a major factor in global warming.

That's why, on World Environment Day, a minimum of five million trees will be planted throughout Mexico—as many as possible planted by children.

At the same time a reforestation telethon will be broadcast live via satellite and by radio around the world.

Countdown To The Millennium.

Now, in the twilight of the 20th century, is a time to re-establish our commitment to the earth and embark on a new decade of environmentalism as we count down toward the year 2000.

Capsule of Hope.

A time capsule containing personal messages of hope for the next generation will be buried during closing ceremonies. The capsule, designed by Mexico's leading architect, will be sealed until June 5, 2000.

World Environment Day will serve as a symbol of international ecological solidarity by bringing together representative groups who will draft a letter to all the peoples of the world with concrete recommendations for safe-guarding the planet.

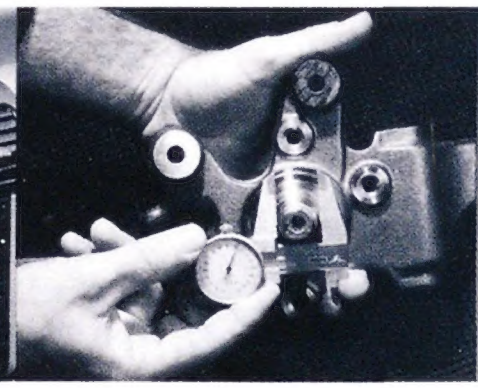
This event also provides an opportunity to break away from our dependence on fossil fuels and start encouraging an international energy policy that supports alternative energy sources and reduces the threat of contamination.

Initially, your children may not know how successful World Environment Day was. But eventually, they'll find out for themselves.

MEXICO
WORLD
ENVIRONMENT
DAY
JUNE 5, 1990.

A new line of thought. A new line of cars.

The 1991 Ford Escort. Big thinking in a new small car. The 1991 Escort Sedan, Wagon and GT mark a new era for the small car. By incorporating some of the best thinking from around the world into the design, engineering and building of this new line of cars, we achieved dramatic results: Three very different cars that will make a very big difference.



Its engineering, state-of-the-art. The way it's engineered is just one way this Escort makes a difference. Its powerplant, a 1.9 liter four-cylinder, employs Sequential Electronic Fuel Injection for improved performance feel. Up to now this feature was found only on larger, more expensive cars.

To reduce engine noise and vibration, Escort offers two isolated subframes which, along with a longer wheelbase, new front and rear independent suspension designs, and new rack-and-pinion steering, deliver a ride that's smooth, quiet and confident. Something you don't always associate with a small car.

Its design is advanced. The new Escort Sedan brings a refreshing level of design sophistication to its class. Inside, it makes efficient use of space, allowing room for five. You can even reach the cargo area from the inside, thanks to a convenient split/fold rear seat.

Escort's exterior design specifies an exacting fit and finish. Semiflush glass and integrated headlamps contribute to its aero shape which registers a low .34 coefficient of drag.

The manner in which this new Escort barely makes a ripple in the wind is just one of the reasons it will cause quite a stir.

Buckle up — together we can save lives.

Our goal: Build a car to rival any small car in the world. We set the goal, then set out to achieve it, spending two billion dollars on design and engineering; on the retooling and development of state-of-the-art manufacturing facilities; and on extensive training programs for the people who build these cars.

The look and feel of this Escort tells us our money was well-spent. Its affordable price says yours will be, too.

The Next Escort

Have you driven a Ford...lately?

"White Label"
DEWAR'S
BLENDED SCOTCH WHISKY
100% SCOTCH
PRODUCT OF
750 ml
Latest reports indicate that high fashion has made little progress in Scotland. Happily, it still reaches only as far as the knee. The good things in life stay that way. Dewar's never varies.
DEWAR'S SCOTLAND
© 1990 SCHENLEY IMPORTS CO. N.Y. NY • BLENDED SCOTCH WHISKY • 43.4% ALC/VOL